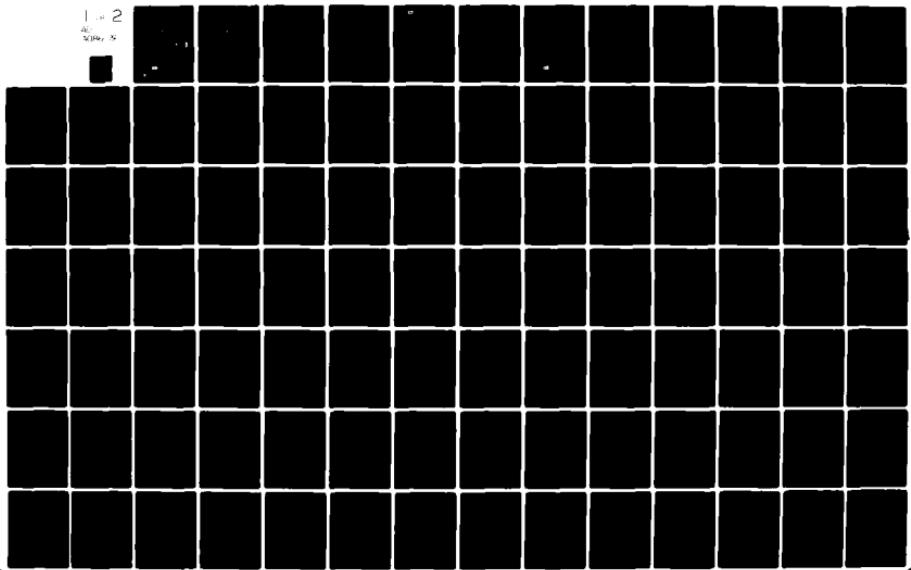
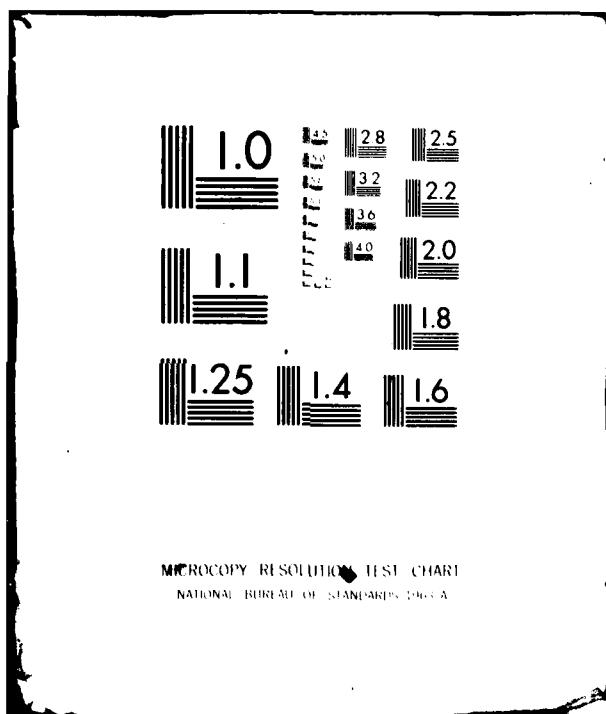


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AN ANALYSIS OF COMMERCIAL COMMODITY ACQUISITION

Bruce N. Angier
Thomas B. White
Stanley A. Horowitz

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The equipment studied is that assigned to and used by a Marine 105mm howitzer battery. The method used to gather the commercial cost estimates was to survey commercial manufacturers to obtain cost data on possible substitutes. This method uncovered several items with significant cost-saving potential.



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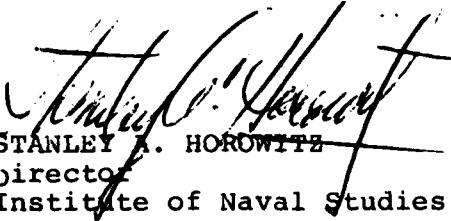
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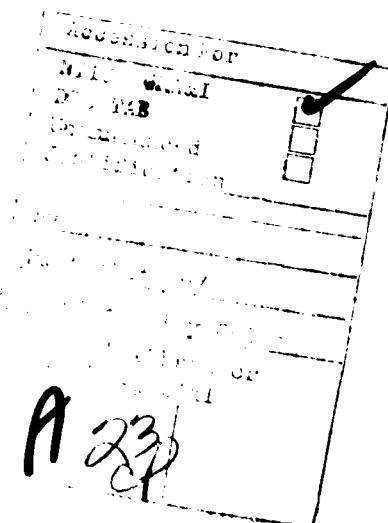
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AN ANALYSIS OF COMMERCIAL COMMODITY ACQUISITION

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All remaining errors and omissions are the responsibility of the authors.

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EXECUTIVE SUMMARY

The purpose of this study is to determine whether there are potential cost savings available to the military through the increased purchase of commercial, or "off-the-shelf" equipment and material. This method would be in opposition to the normal procurement methods which are based on the creation of military "design" specifications, and then purchasing based on those specifications.

There are two major ways this study differs from previous efforts. The first is that it is designed to serve as a preliminary to a field test of the items that show potential saving. The second is that the study is designed to use low cost, easy to gather, information to determine potential savings. This is done by surveying possible suppliers. We have chosen to call this an "extensive" study. This is as opposed to previous studies which focus on a few items in great detail -- an intensive study.

The study reaches several conclusions. The first is that this extensive technique does indicate areas for potential savings. If twenty of the items we report were procured commercially on a Department of Defense (DOD) wide basis, the undiscounted annual savings would be approximately \$5 million, a saving of 23.8% on the subset of items we studied.

The second conclusion is that these possible savings can only be demonstrated through a field test, or some other test and evaluation procedure. This type of survey indicates areas of potential saving; it does not do detailed studies on individual items.

A final conclusion and recommendation is that some way should be found to make gathering information on commercial substitutes an on-going activity. Suppliers have both the knowledge and incentive to suggest alternative techniques and substitute products. Item managers and purchasing agents have the detailed knowledge to appreciate these suggestions, but not necessarily the incentives or the channels to pass this information to those who write specifications and mandate requirements. It is suggested that an incentive structure and an institutional framework be developed to facilitate the gathering and dissemination of this information.

AN ANALYSIS OF COMMERCIAL COMMODITY ACQUISITION

INTRODUCTION

The purpose of this study is to determine whether there are potential cost savings available to the military through the increased purchase of commercial, or "off-the-shelf" equipment and material -- as opposed to purchase through the process of creating military specifications and then purchasing based on these specifications. The analysis includes some tangential examination of the cost differences between these two basic methods of procurement in terms of inventory holding costs and transportation and delivery costs, as well as estimates of purchase price differences. The study focuses on cost savings available to a particular tactical unit. It is structured so that it can be used as the preliminary research for a full-fledged field test. Such a test would allow the measurement of operating, maintenance and replacement costs, as well as indicate any degradation or enhancement of mission capability due to the use of off-the-shelf items.

The study is organized into five sections. This section includes the introduction and a plan of analysis. Section two is a summary of recent work in the area of commercial commodity acquisition. An effort is made to show the origins and thrust of on-going research in this area so we can be clear on how this study adds to existing knowledge. Section three deals with the structure of this particular study. It shows how we decided what particular items to examine for possible replacement with commercial substitutes. In particular, it explains why the equipment in the Marine 105 mm howitzer battery was chosen as the object of our attention. Section three also describes the procedures used for gathering data on both the military equipment already in use and on potential commercial substitutes. Section four presents the results of the analysis, including sensitivity tests to indicate whether errors in the data and poor cost estimates might significantly change the findings of the study. It also contains a more detailed look at the problems encountered in gathering this data. The final section of the study consists of a summary and conclusions, as well as a strong plea for some form of field test or other test and evaluation procedure in an effort to gather direct performance data on the potential substitutes in question.

PLAN OF ANALYSIS

Simply stated, we plan to gather information on the cost to the military of a small subset of all commodities purchased by them, gather information on the availability and cost of commercial substitutes, compare these two costs, and highlight the differences which are favorable to the military.

There are two general points about this study which make it different from previous work in this area. One, it is designed to gather and analyze low cost, low quality data about the availability and cost of substitutes. Previous studies tend to gather higher quality data, which is also much more costly. The second point is that the purpose of this study is to gather data on a subset of items preparatory to a field test of those items. This requires some foresight in the choice of items for which data are gathered.

The yearly cost to the military of buying a particular good or service is the total cost of one unit of the item multiplied by the number of units used in one year. However, gathering this information is not a simple matter for the items in question. There are problems with military costs, yearly quantities, and commercial costs.

The difficulty with existing data on the cost of items to the military is that some of the military costs are reported based on military purchase direct from the manufacturer, while other costs are reported as if the military purchased the item from a wholesaler. For items purchased direct from the manufacturer, the real cost of the inventory and delivery functions of the wholesaler are now performed by the military, but not included in the reported price. This biases these costs downward, which biases potential savings in the same direction.

Determining the quantity used in a given year is also difficult. Some items have no estimated service life, so that depreciating them is difficult. Other are subject not just to the normal vicissitudes of age, but are also particularly vulnerable to random catastrophic failure due to accidents or misuse. These different possibilities must all be analyzed to determine the quantity used in one year. Finally, the methods used to gather information on the price and availability of commercial items may allow firms too much leeway to give unrealistically low bids.

Once assumptions have been made to handle the problems sketched above, the study then analyzes the resulting data and highlights the candidates which show potential cost savings. The study then tests the sensitivity of the results to the possibility of incorrect commercial prices, and applies the cost savings to DOD-wide purchases to determine potential cost savings to commercial acquisition of this subset of commodities. Finally, conclusions and recommendations are presented.

BACKGROUND

The purpose of this section is to describe recent experience in military and government procurement, to describe other ongoing commercial commodity acquisition projects, and to show how this study will add to existing knowledge in the field of commercial commodity acquisition.

The thrust of government procurement policy between World War II and the late 1960's has been towards centralization. In civilian procurement, results of this policy can be seen in the creation of the General Services Administration (GSA) in 1948. This led to the development of what is now the Federal Supply Service (FSS). In military procurement, the height of this policy seems to have been reached in the middle 1960's, with the implementation of the centralized management systems brought to the Department of Defense (DOD) by Robert McNamara. This resulted in what is now the Defense Logistics Agency (DLA). While all procurement decisions were not centralized, a significant proportion were.

Starting in the late 1960's, a counter movement in procurement philosophy appears to have developed. The basic thrust on this position is contained in the 1972 Report of the Commission of Government Procurement. The Commission summarized its results that are relevant to this study by saying:

"The recommendations ... provide the means for implementing the policy of basing decisions on a consideration of total economic cost. They include:

- Providing the appropriate consideration of significant cost factors in establishment and operation of procurement and distribution systems, techniques, and operational arrangements ...
- Establishing criteria for development of Federal specifications to achieve greater consideration of cost-benefit analysis, including the state-of-the-art, in commercial product development..." (reference 1)

The motivation for this study, as well as many others, comes from these two recommendations. The first deals with minimizing the total cost of purchase items, including costs for procurement, inventory and delivery. The second recommendation emphasizes two other costs of the then-current procurement system. The first cost is that there are significant direct expenses to develop, maintain, and apply detailed military design specifications. The second cost is that lower cost procurement opportunities may be lost through rigid adherence to outdated or "gold plated" specifications.

The implementation of recommendations such as these has been slow and fragmentary.¹ When it has occurred, it has taken the form of greater reliance on the flexibility of the existing private system of inventory and delivery, and the recasting of military specifications to use "commercial acceptability" criteria. These steps allow the military to take advantage of the work which private standard-making organizations and the vicissitudes of the market-place have performed in weeding out poor designs and equipment.

The branch of the Federal Government which is responsible for implementing this policy is the Office of Federal Procurement Policy (OFPP) within the Office of Management and Budget (OMB). One result of the work of OFPP is OMB Circular A-76. While it includes many other items, for our purposes its basic import is that it spells out in much greater detail the recommendations of the Commission on Government Procurement.

Another result of these policy initiatives is the Acquisition and Distribution of Commercial Products (ADCP) program run by OFPP. Closely related to this is DOD's Commercial Commodity Acquisition Program (CCAP), administered by the Defense Logistics Agency (DLA). As it is with CCAP that this study can best be compared and contrasted, a more detailed look at this program is warranted.

Some members of CCAP describe the program as "An incremental pilot test approach... designed to provide documented cases of commercial acquisition without detailed specifications..." while preventing "catastrophic failure which could result if premature, full-scale acquisition were attempted..." (Reference 3). The CCAP study chose 72 commodities which were felt to be representative examples of items provided through DLA². Through detailed study of each item CCAP tried to answer two basic questions: could the specifications be rewritten to allow for a more "commercial" product without degrading mission capability, and would use of commercial products allow less costly methods of ordering, stockage, and delivery? Different methods of ordering, etc. are also being addressed by DLA through its Commercial Item Support Program (CISP). This project developed the Total Support Cost model (TSC) to estimate these indirect costs of procurement.³

¹ See Appendix A for a summary of reference 2 on this process.

² For a more detailed summary of the structure of this study, see reference 4. For some preliminary results, see reference 3.

³ For a description of the CISP program and the TSC model, see references 5 and 6.

Other studies involving commercial commodity acquisition are being carried out by the Material Development and Readiness Command (DARCOM) and Tank Automotive Research and Development Command (TARADCOM). They examine the potential of using basically commercial vehicles in a tactical setting. These studies offer an intermediate case between procurement to military design and pure off-the-shelf purchase for the following reasons: wheeled vehicles are such a large dollar item (unlike most off-the-shelf items), and many kinds of wheeled vehicles are almost never bought directly off-the-shelf even in the commercial market.

The first point can be made using the following example. Replacing aged M880 (3/4 - 5/4 ton) and some M151 (Jeep) vehicles may require purchase of 60,000 3/4 - 5/4 ton trucks over a three year span. Buying these trucks to basically commercial specifications could save \$1,950 per vehicle, an overall saving of \$117 million.¹ With potential savings of this magnitude, it is worthwhile to study each item separately and in detail. This is different from most of the items actually purchased for use by the military. It is these smaller items for which we will try to develop low cost data on potential cost savings.

The other reason this is an intermediate case is the degree to which wheeled vehicles, particularly trucks, can be thought of as off-the-shelf items. Particularly as trucks become larger, they can all be thought of as being customized, that is, configured to the buyer's specifications. For example, the Ryder Truck Rental Company purchases heavy duty tractors every year. They have a choice of five different engines (two manufacturers) in three or four different power classes, each one mated to a transmission tuned to the torque and horsepower characteristics of the engine.² They also have a choice of "standard" or "cab-over" configuration for the cab. This kind of flexibility, lower cost and minimum field testing are already being tapped by the services in their purchases of light, medium and heavy equipment transporters.³ The question is whether the military can find and take advantage of similar situations on smaller dollar items.

Another commercial practice which might serve as a model for military procurement is the way in which U-Haul International buys

¹ See Appendix B, for a more detailed discussion of this program.

² Phone converstaion with Mr. W. W. Brown, Manager, Pricing and Specifications, Purchasing and Engineering Department, Ryder Truck Rentals.

³ DARCOM, Ed Gardner.

from the Ford Motor Company.¹ When U-Haul conceptualizes an option that would be particularly useful for their needs, they present a basic engineering description to Ford. The description is then studied by Ford's engineering departments, and they often develop a Domestic Special Option that is made available to anyone. If the option proves to be particularly successful, it may end up end up as a part of later years' regular production run.

The important facts here are that the buyer and supplier are communicating and interacting, and that the interaction often results in a profit-making opportunity for the firm. This means that the firm will support part of the development cost, and the cost of maintaining an inventory of spare parts. Both of these points could be important in lowering the cost of military procurement.

The lessons learned from these stories about wheeled vehicles are summarized in Figure 1.



FIG. 1: THE SPECTRUM OF PROCUREMENT METHODS

This suggests that there are (at least) three intermediate cases between the polar cases of military design specification and "off-the-shelf" procurement. Left to right, the three intermediate

¹Telephone conversation with Mr. Joe Hansbury, Manager of Repair, Maintenance and Manufacturing, U-Haul International.

cases are represented by the M880, the U-Haul - Ford interaction, and the purchase policies of Ryder Truck Rentals. These intermediate cases might actually be thought of as the most satisfactory examples of commercial commodity acquisition. Many of the military specifications can be satisfied, while permitting proven products with commercial market acceptance to be used. In some cases, R&D expenses can be spread over more units of output. Also, the expense of writing and maintaining specifications can be decreased. Although some features unique to the military may have to be added, these have been a minor part of the total cost of the wheeled vehicles mentioned above.

METHOD OF ANALYSIS

This section is designed to accomplish three objectives. The first is to develop the dichotomy between "intensive" and "extensive" studies. This classification indicates how this study, an extensive study, differs from the studies described in the background section, which are intensive studies. The second objective is to give the reasons why we choose the particular sample of goods that we examined for potential substitutes. The third objective is to describe the source and explain the type of data to be collected on both military and commercial items.

INTENSIVE VERSUS EXTENSIVE STUDIES

Previous studies of commercial commodity acquisition have been intensive in nature. They have focused in great detail on a few specific items.¹ This has the advantage that the conclusions that are reached clearly apply to the items studied. However, it is usually not obvious that these conclusions can be carried over to other products procured for military use. Also, an intensive analysis requires assembling a great deal of specialized technical information on the particular items tested. This may be costly and time-consuming.

The method of analysis used in this study is extensive. It foregoes the depth of previous studies in order to analyze a wide sample of items used by large segments of the military.

This study will also try to address the total support cost of the sampled items. This approach should allow a broadly-based evaluation of the potential gains from a change in procurement philosophy.

CHOICE OF SAMPLE TO BE ANALYZED

The scope of the analysis must be less than universal. We cannot study the acquisition of everything bought by the Armed Forces. Therefore, we must limit the range of our inquiry. On the other hand, the sample of items studied should be representative of the population of items used by the military. This gives an incentive for a large sample.

The specific realization of these general criteria is that the equipment used by a Marine 105mm Howitzer battery has been chosen as our sample. This narrows the scope of the study to a manageable

¹ The CCAP studies mentioned earlier (references 3 and 4) are one example of this. For another example of a study of a single item, see reference 7.

level. There are 219 items directly assigned to the battery on its Table of Equipment (T/E), 60 items listed in the T/E which are assigned to the battalion, but distributed to the battery, and 250 consumable items of which an average battery used more than \$24 worth in one year. When account is taken of duplicate and unidentified items, this leaves 505 items for analysis. This is a manageable number of items, yet it fairly represents classes of equipment used in most military units at present.

There are several reasons for selecting this particular unit. One is the desire to avoid the costly, complex equipment which is often found in Navy and Air Force units. Such equipment seems more amenable to study through the intensive methods described above. Two factors were decisive in choosing to study a Marine unit instead of an Army unit. One is that CNA has a close, longstanding relationship with the Corps. We have much more direct contact with their command structure. Also, the Marine Corps' command structure is smaller and more flexible, characteristics which would be very helpful in the conduct of a field test of those items the study identifies as candidates for off-the-shelf procurement. Finally, members of our study group already have accumulated institutional knowledge of Marine Corps operations, and this would have to be newly acquired to study an Army unit.

The choice of the 105 mm howitzer battery is less clear cut. Table 1 shows the total number of items in various classes in the Marine Corps' Table of Authorized Material (TAM), and the number of these items that are directly assigned to various company-sized units. At first glance, table 1 seems to select against the infantry company, and for the headquarters battery. Without further information, the choice of a unit with an intermediate number of items assigned to it is not clear. The reason the 105 mm battery was chosen can be understood by recalling that the project was originally conceived as the first step toward a field test of commercial substitute equipment. There are three 105mm batteries in a battalion. This means that one (or two) batteries could be supplied with commercial equipment, and one of the other batteries could be used as a control. If the headquarters battery was used as the test unit, the control would have to be in another battalion, making this a division-wide exercise. This would also decrease the validity of the control, because different battalions could more easily encounter different operating conditions and equipment usage.

METHODS USED TO OBTAIN MILITARY AND COMMERCIAL COST ESTIMATES

This section describes the procedures used to obtain the cost estimates presented in the next section. Total life cycle costs are the sum of three components: the original purchase price; the

cost of inventory and delivery; and the costs of operating, maintaining, and replacing the equipment after it has been delivered. The following material indicates what components of total cost we were able to obtain, and where we fell short.

TABLE 1
MATERIAL ASSIGNED TO POTENTIAL CANDIDATE UNITS
DISTRIBUTION OF COMMODITY ITEMS

Commodity item	TAM	Number of items in:			Inf Co
		105 mm howitzer Btry	Artillery Hdqt Btry		
Communications-electronics	386	41	75		1
Engineer	303	5	18		1
General supply	560	121	158		35
Motor transport	123	24	32		1
Ordnance	<u>333</u>	<u>28</u>	<u>25</u>		<u>11</u>
UNIT TOTALS	1705	219	308		49

Cost of Military Specification Items¹

In the simplest case, the total cost of a particular item to the military would be the purchase price of the item multiplied by the quantity purchased. However, this simple case abstracts from several complications which can significantly change the total cost of the item.

As far as the price is concerned, the item is not just purchased, but it must be delivered, and it must often be inventoried by the military for some time before it is used. There also may be spares included in the initial price; in effect, this just means that part of the maintenance costs appear in the purchase price.

¹ See Appendix C, for further information on data sources.

The quantity used is also complicated by three factors. One is that a given item may have a very short expected service life. For example, keeping a 105 mm howitzer battery supplied with one maintenance shelter tent over a 20-year period will have a very different total cost if the planned service life of the tent was 2 years instead of 10.

The second factor is that some items fail catastrophically before the end of their expected service life. For example, a truck might have an expected service life of 15 years, yet be driven into a ravine during exercises and totally destroyed during its first month of use. The military has developed information on which items tend to have these sorts of catastrophic failures, and has estimated "replacement factors" for these items. These replacement factors say that, every year, some proportion of items will be rendered unusable for reasons other than aging.

Finally, the third complication in determining the quantity used is that, for some of the items in our sample, there were no data on number issued, expected service life, or replacement factor. These items only showed the number purchased in that year. They require different handling than the previous cases.

Our approach to combining the different factors which influence the quantity was to develop an average annual quantity purchased. When only the number purchased that year was available, this was used as the best estimate. Whenever an expected service life was available, it was assumed that, on average, the proportion of the item replaced would be the reciprocal of the planned life. That is, if the item had a planned life of five years, every year one fifth of the items would be replaced.

The determination of the yearly quantity when there is a replacement factor is more difficult to model. In the simplest terms, it is an additional reason to have to buy new equipment. An oversimplified, but illuminating, way to think about this is to say that every year the proportion of items represented by the replacement rate have to be purchased. For example, if the replacement rate is .25, then every year 25 percent of the items in question are lost for reasons other than age. Actually, the process is more complicated than that. However, mathematical results from maintenance and reliability theory can be used to accurately capture these effects.¹

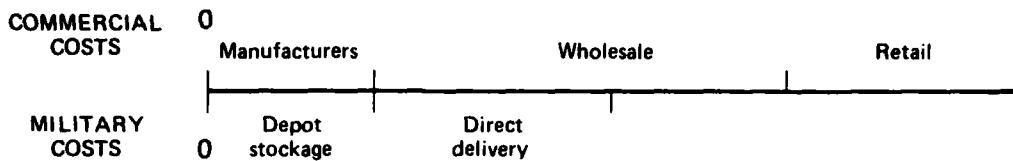
¹ For a more complete and detailed discussion of the process of obtaining the average annual quantity, see Appendix D.

As mentioned above, the price of the items to be studied can also be difficult to determine. One way to see this is to look at the components of the price of a normal civilian item sold in the commercial marketplace to a retail consumer. First, the item is produced by a manufacturer and sold to a wholesaler. At that point the price includes the cost of all inputs and the manufacturer's profit. Sometimes it also includes the cost of warehousing the item. The wholesaler buys the item, transports it to his warehouse, holds it for a while, and then sells it. The price now also includes the transport and warehousing costs of the wholesaler, plus his profit. Finally, the retailer purchases, transports, displays and sells the item to the consumer. The final price includes all the costs and profits mentioned above. Also, the full cost to the consumer includes the activities he had to perform to obtain the item such as : drive to the store, decide among competing products, order it, pick it up, and take it home.¹ For many commercial items, costs added by wholesalers and retailers total more than the amount paid to the manufacturer. This is not usually the case for military items. However, delivery and inventory costs approaching the purchase price are not rare.

The procedure we would like to follow is to obtain military prices at one particular stage of the analogous chain of prices for military goods, obtain the price of commercial substitutes at a similar stage, and compare the two. Unfortunately, this is not possible. The reason is that military prices are not consistently reported at the same stage in the process.

The reason for this is that there are two different ways that DLA contracts to buy the kind of goods we will discuss in the data analysis section. These two procedures are depot stockage and direct delivery. In depot stockage, it is as if DLA took the place of the wholesaler in the example above. In direct delivery, DLA takes a few functions of the wholesaler, but mainly has the units order directly from manufacturers under some sort of pre-existing contract. Depending on how the contract is written (for example, indefinite versus definite quantities, fixed versus varying prices) this arrangement means the price being paid includes some part of the wholesaler's costs. Those differences are summarized in figure 2.

¹The cost of operation and maintenance, could also be included here. It is not. See below for the reason for this omission.



Note: Ignores maintenance and durability.

FIG. 2: COMPONENTS OF OBSERVED COSTS

When this project was initiated, it was felt that an estimate of these costs would be available. The reason is that, as a part of DLA's Commercial Item Support Program (CISP), they have developed a Total Support Cost (TSC) Program.¹ Simply stated, this is a computer program which attempts to allocate all of the wholesalers and retailers costs mentioned above, which are being incurred by the military, to the items in question. Unfortunately, the TSC model is an aggregated model, one that does not easily allow consideration of small quantities of items going to individual units. Also, a significant proportion of the goods we are interested in are not yet included in this model. Finally, particularly with respect to Depot Stockage items, the TSC program allocates overhead costs to individual items. In terms of estimating the additional cost (sometimes called the marginal cost) of a particular item, this may overstate its actual cost.

¹For more details, see reference 5. For further information on the computer program used, see reference 6 or contact George Clark, Division, Operations Research and Economic Analysis Office, DLA-Cameron Station.

The method chosen to deal with the problem of prices taken at different points along this path from manufacture to sale, is to assume that all military prices are taken at the break between wholesaler and retailer. Then, when data on the price of commercial substitutes are obtained, it could be obtained at that same point. This procedure errs on the side of conservatism. That is, if a commercial substitute appears to be cheaper than the current military item, then that difference would only get bigger if the warehousing functions of the "wholesaler" were included.

Cost of Commercial Substitutes¹

In one sense, procurement cost data is more difficult to gather for potential substitutes than for equipment now bought by the military. The reason is that it must be determined whether the commercial item is a "close substitute", and this determination can be difficult. The method chosen by this study is to let the firms in question make this judgment. One may fear that this procedure will allow firms to give artificially low price quotes. However, we have tried to keep transactions as close to "arm's length" as possible. We have emphasized that we are not in a position to buy anything. Due to this emphasis, we hope to minimize the incentive for firms to present unrealistically low bids.

Once the unit price and delivery costs of commercial substitutes are obtained from firms, then they can be compared with the military prices for possible savings. The one important omission in this comparison is that the magnitudes of maintenance, operating and replacement costs can only be properly assessed by a field test with a control.

¹ See Appendix E for information on the forms used to gather this data.

ANALYSIS OF SELECTED ITEMS FOR MILITARY-
COMMERCIAL PRICE COMPARISONS

This section consists of four subsections. The first gives some descriptive statistics on the military items analyzed. It shows the total purchase price and average yearly cost of supplying a 105mm howitzer battery. The second subsection includes descriptive statistics about the commercial responses we received. This shows the kinds of goods that elicited the most positive responses, and gives some indication of the pitfalls of the method of data collection. The third makes a more detailed analysis of the commercial substitutes, to highlight those which show the greatest potential for cost savings. The fourth subsection looks at the sensitivity of the results to error in the commercial prices, and gives data on possible cost savings DOD-wide.

MILITARY ITEMS

There are 505 different items in the list of equipment assigned to or used by a 105mm howitzer battery. To show the kinds of items in the sample, they have been separated into groups based on their Table of Authorized Material (TAM) Control Number Commodity Designator, or by association with similar items which have a Commodity Designator. The results appear in table 2.

TABLE 2
COMMODITIES BY TYPE AND COMMODITY DESIGNATOR

<u>Commodity Designator</u>	Type 1	Type 2	<u>Consumables</u>	<u>Total</u>
Communications-Electronics	9	31	59	99
Engineer		5	2	7
General	100	73	55	228
Motor	18	6	78	102
Transport				
Ordnance	30	3	36	69
TOTAL	157	118	230	505

Note: Type 1 - "Material which are found in the Type 1 section of the tables of equipment (TEs) for each Marine Corps Unit

Type 2 - "Material which may be used...on an 'as required' basis"^a

Consumables - "Items which are consumed during their use.

^aTAM, p. v-vi.

The dollar volume of the items, in absolute and percentage terms, is presented in table 3.

These data reveal several items of importance for this study. The first concerns the difference between the initial purchase dollar volume and the average yearly expenditure. A quick examination of the items assigned to and used by a howitzer battery reveals that only a little more than half (55.5%) of the initial purchase dollar volume really has commercial procurement possibilities.

The remaining 44.5% are ordnance items. Because of specific requirements which often must appear as design specifications, and because there is little or no private market for some ordnance items, they are unlikely to have commercial substitutes. When we look at annual expenditure the picture changes. 71.6% of the annual expense is non-ordnance, and therefore, more likely to be commercially available.

A great deal of attention has been and is now being devoted to the commercial procurement of motor transport items, which constitute approximately one quarter of the initial purchase and one third of the annual expense of the battery. The reason for this attention can be seen by examining the dollar volume of motor transport purchased by the military. For further information, the reader should consult the background section and Appendix B on the history of the M880 3/4-5/4 ton truck.

Though only about one sixth of the initial expense of outfitting the battery is in the General Supply category, General Supply items account for almost one quarter of total cost when allowances are made for the shorter planned life and the replacement factors attached to these items. In addition, 45% of the different items, and 75-80% of the total items used by the battery fall under this heading. Therefore, these items contribute more to the paperwork and inventory cost of support than their dollar volume would indicate. It could be argued that greater arms-length commercial provision of these items would tend to lower such transaction costs, since the costs would tend to fall upon agents (in this case firms) who have an incentive to minimize costs. At the very least, commercial provision would serve to highlight these costs. Such heightened visibility is often the first step towards greater control, as GAO reports regularly demonstrate.

Evidence that arms-length provision tends to lower the paperwork and inventory cost of small ticket, frequently ordered items is supported by recent DLA efforts to determine the cheapest methods to provide items under the Commercial Item Support Program (CISP).

TABLE 3
NUMBER AND DOLLAR VOLUME OF ITEMS

	Different items	Total items	Items per year	Initial purchase volume	Average yearly expenditure	Initial to annual expense
	#	\$	#	\$	\$	\$
Communications-electronics						
Engineer	99	19.6	1,837	13.5	1,398	15.2
General supply	7	1.4	10	0.01	3	0.01
Motor transport	228	45.1	10,737	79.1	7,138	77.4
Ordnance	102	20.2	225	1.7	187	2.0
TOTAL	69	13.7	5,774	5.7	499	5.4
	505	100.0	13,582	100.0	9,225	100.0
					731,430	100.0
					205,500	100.0

NOTES:

1. Components may not add to totals due to rounding.
2. For a more complete explanation of "number of items per year" and "average yearly expenditure", Appendix D.
3. Column 6 is the ratio of average annual expenditure to initial purchase expenditure.

Their calculations show that, all other things equal, as the frequency of orders rise, direct delivery methods become cheaper at five of the seven Defense Supply Centers (the other two find central stockage cheaper at all times).¹

CIVILIAN ITEMS

Before discussing these items, we would like to make an extended digression on the survey methods used to obtain this data. This will focus on lessons learned. (For an example of the forms used, see Appendix E).

The first method used to gather information from commercial producers of these items can be described as a "blind letter" approach. After obtaining the list of items used by the battery, standard references² containing manufacturers sorted by type of product were consulted to obtain names and addresses of firms manufacturing similar items. Then a cover letter, a list of possible products, several forms for describing commercial product substitutes, and any specifications, or other more detailed information, were mailed to these firms. This method was not successful. The rate of positive response³ was approximately 3 percent of the letters mailed. Seventeen percent responded that they made no substitutes for the items in question. The other 80 percent of the letters disappeared without a trace.

The cause of this low rate of positive responses appears to be that the letters were not addressed to a specific person within the organization. This resulted in letters being discarded, either before or after reading, without being answered. This problem was resolved by making first contact with a phone call. After determining with whom the matter should be discussed, our conversation was directed towards deciding whether the company in question appeared to make a close substitute. If the answer was positive, and the person in question was willing to accept our inquiries, then, and only then, was the material mailed. Due to this screening, and with the addition of a follow-up phone call to those who did not reply within a month, we were able to obtain a positive response to approximately 50% of our letters. In spite of our telephone screening, 30% responded negatively.

¹George Clark, DLA

²E.g., Reference 8.

³A positive response is one which indicates that the company does in fact make a close substitute, and that they did send a price estimate. It does not imply that the commercial price was lower than the military price.

The responses themselves showed an almost exclusive concentration in the General Supply area. This is not surprising. Substitutes for the two other largest dollar categories, Motor Transport and Ordnance, were not diligently sought. For Ordnance, the major reason is that preliminary screening indicated close commercial substitutes were not available. As we have noted, for Motor Transport, we discovered that investigations into the availability of potential commercial substitutes, such as those discussed in Appendix B, were far more complete than our study was to be.

The final count shows 85 positive responses on 42 different items. These items fall entirely under the heading of General Supply. Therefore, 18.4% of the 228 items in this category received a positive response. The number of positive responses per item is shown in table 4.

TABLE 4
NUMBER OF POSITIVE RESPONSES PER ITEM

Number of items	1	2	3	4	5	6
	24	7	4	3	1	3

The heavy concentration of single responses should not be taken as a sign of a lack of other suppliers. It is related to the method used to search for commercial substitutes. Once one positive response was returned, effort was expended in other areas.

SPECIFIC ITEMS

We will now turn to a detailed discussion of specific items. Without extensive testing and evaluation, the prices presented are not proof of substitution possibilities, but they are indicative of the items available. A complete list of the 505 items is reproduced in Appendix F, with prices and quantities of the items included. Also, a list of the items which fall under the heading of general supply is shown, and a table which lists each different item for which a positive reply was received. Finally, a table appears which shows all prices received in positive responses.

Wrist Watch and Stopwatch

This is one of several cases where the survey found one of the manufacturers of the military item. The commercial substitute was 1.5% less than the military price. The only potentially important differences were: that the civilian item appears to

use a phosphorescent, as opposed to radioactive, luminescent material on the hands, and that a metal, rather than cloth, band is provided. Also, a date function is included on the commercial substitute.

In addition, digital watches were offered as substitutes. They suggest two more interesting questions. They are: why not use Liquid Crystal Display (LCD) or Light Emitting Diode (LED) watches and stopwatches; and why not combine the watch with the stopwatch? The only immediately evident additional cost would be for batteries. At a discount house, these batteries are \$1.50 a piece, and one is required per year. Using the assumed life span of the military watch, the undiscounted present costs of all the alternatives are presented in table 5 below:

TABLE 5

WRIST WATCH COMPLETE, MILITARY PRICE \$23.67
QUANTITY -- 18, SERVICE LIFE -- 5 YEARS

Substitute	Price	With batteries	Comment*
Texas Instruments 5-function LCD	10.00	17.50	D
Texas Instruments	11.00	18.50	D-illumination
Westclox	23.31	none	M-not digital
Casio Chronograph LCD	24.00	31.50	D-with stopwatch
Majestron LCD	23.00	30.50	D-with stopwatch
Armitron LCD Chronograph	33.00	40.50	D-with stopwatch, backlight

* - Abbreviations

R = Retail

D = Discount

M = Manufacturer

There are several reasons why these prices should be viewed as worst case estimates. First, all the digital watch and battery prices are discount retail; lower prices, and possibly lower support costs, are available through direct buying. Next, if recent history is any guide, prices of digital watches will remain constant or fall. Finally, even if these wrist-stopwatch combinations would not be used as a wristwatch alone, it could be used as a stopwatch alone.

Table 6 shows the price of potential substitutes for the military stopwatch.

TABLE 6

STOPWATCH: MILITARY PRICE \$42.89,
QUANTITY-2, SERVICE LIFE -- 3 YEARS

Substitute	Price	With batteries*	Comment
Sears	30.00	30.00	
Heuer Trackmate	29.00	29.00	
Casio Chronograph LCD	24.00	28.50**	with watch
Majestron LCD	23.00	27.50**	with watch
Armitron LCD Chronograph	33.00	37.50**	with watch
AMF LED Stopwatch	25.50	30.00**	single event
AMF ADD Stopwatch	35.00	39.50**	single event plus

*-If applicable

**-Three year life span, therefore, three years of batteries.

It should be noted that several of the chronographs have features directed at jogging and running enthusiasts, such as the ability to keep track of more than one individual, and to give lap or split times while maintaining running totals. Also, if accuracy is an overriding concern, the digital stopwatches are often accurate to the 100th of a second, and there is not the parallax problem involved in reading the hands on a standard stopwatch. Finally, even if the conventional stopwatch configuration is to be retained, there are two substitutes (Sears and Heuer) listed at significantly lower prices.

Using the best case figures above for the six different possible combinations of conventional, digital, watch and stopwatch, the cost savings summarized in table 7 emerge.

As these comparisons show, significant potential for cost savings is available through the use of technology precluded by current specifications.

Cold Weather Drawers and Undershirts

The commercial responses are listed in table 8. The question of whether the cost savings are offset by a lower quality or less effective product depends on three considerations: durability, the

TABLE 7
COST SAVINGS: WATCHES AND STOPWATCHES

Class	Item*	Initial purchase savings	% savings	Average annual savings
Conventional watch	Westclox	6.48	1.53	1.30
Digital watch	T.I. 5 function	1111.06	26.1	22.21
Conventional stopwatch	Heuer	27.78	32.4	9.26
Digital stopwatch	AM LED	25.78	30.0	8.59
Watch-stopwatch	Majestron LCD	N O	S A V I N G S	
Watch-stopwatch as stopwatch	Majestron LCD	30.78	35.8	10.26

*All digital equipment used as a watch includes five batteries. When used as a stopwatch three batteries are included.

TABLE 8
DRAWERS AND UNDERSHIRTS

Military item - drawer - \$6.25, quantity - 252, planned life - 2 years
 Military item - undershirt - \$7.45, quantity - 252, planned life - 2 years

Item	Price	Initial purchase savings	% savings	Average annual savings
Drawers				
Royal Knit Drawer	2.25	1,008.00	64.0	504.00
Royal Raschel Knit Drawer	3.00	819.00	52.0	409.50
Medalist Tuck Stitch Drawer	3.25	756.00	48.0	378.00
Medalist Ski Skins Drawer	5.25	252.00	16.0	126.00
Medalist Wool Ski Skins Drawer	6.50	N O S A V I N G S*		
Medalist Nomex Drawer	13.50	N O S A V I N G S		
Undershirts				
Royal Knit Undershirt	2.25	1,310.40	69.8	655.20
Royal Raschel Undershirt	3.00	1,121.40	59.7	560.70
Medalist Tuck Stitch Undershirt	3.25	1,058.40	56.4	529.20
Medalist Ski Skins Undershirt	5.25	554.00	29.5	277.20
Medalist Wool Ski Skins Undershirt	6.50	239.40	12.8	119.70
Medalist Nomex Undershirt	13.50	N O S A V I N G S		

* - Savings do exist in a large quantity buy.

degree of cold weather protection offered by the military item and the commercial substitutes, and whether the items would be bought in large quantities.

The question of durability of the substitute can only be answered with a field test. The temperature protection offered is also crucial. Given that wool tends to offer greater warmth than cotton or polyester, it may be that only the Medalist Wool Ski Skins are actually comparable with the military item. Even if this is the case, a 12.8% saving on one item, the undershirt, used by many individuals in the services would be well worth further examination.

It is also important to consider whether extra savings are available on large quantity purchases. The cost figures in the table for commercial substitutes are based on purchases of three dozen undershirts or drawers at one time. For the wool items, this is a purchase of \$225. If a \$300,000 bulk purchase for central stockage was being contemplated, a 20% savings in purchase price could be obtained.¹

Using the Medalist Wool Ski Skin Undershirt mentioned above, the price would be \$5.20, and the savings would be 30.2%, with initial savings of \$567.00 and average annual savings of \$283.50. This is a 137% increase in the apparent cost savings. Also, the drawers would now offer an initial cost savings of \$264.60 and an average annual savings of \$132.30. This amounts to 16.8% of current expenditure on drawers.

Pneumatic Impact Wrench

There are three problems related to the pneumatic impact wrench. The first is whether the electric wrenches listed would be adequate substitutes for the pneumatic wrench. The second problem is the significant quality variation in the potential substitutes. The third is not directly visible from the data presented below, but deals with the prices charged for this item in the recent past.

As can be seen from the data in table 9, the commercial electric impact wrenches are price-competitive with the military pneumatic impact wrench. However, the amperage requirements of the electric

¹While this may only involve transferring a part of the real cost of the item from direct view into the DLA budget for warehousing, this may well be the exact situation that currently exists. If this is the case, then the proper price comparisons are with the 20% lower commercial price. The reasons for considering small quantities are discussed in the section on Method of Analysis.

TABLE 9
PNEUMATIC IMPACT WRENCH, 3/4 INCH STRAIGHT DRIVE

Military item price - \$379.00, quantity - 1, planned life - 10 years

Item	Price	Initial purchase savings	% savings	Average annual savings
Rockwell	200.00	179.00	47	17.90
AEG (Electric)	315.00	64.00	17	6.40
Bosch (Electric)	330.00	49.00	13	4.90
Chicago Pneumatic	350.00	29.00	8	2.90
Cleco (Dresser)	625.00		N O S A V I N G S	

drill may make it non-substitutable in field use, where a generator is necessary to supply power.

To the extent that price differences indicate quality differences, it is clear that there are significant differences between the lowest price (\$200.00) and highest price (\$625.00) impact wrench. Even the comparison between the lowest price commercial wrench and the military-specification wrench (\$200 vs. \$379) is large. This is a situation where only a testing and evaluation program could determine whether the life cycle cost of supplying a unit with an impact wrench would be lower by buying an expensive, but longer lasting wrench, or a cheaper, but more failure-prone wrench.

The final discovery made during the examination of this item is not immediately visible from the data presented above. It deals with the price at which this product was available to the military in the past. At the start of this study, cost data for items currently used by a howitzer battery were gathered from the Logistics Management Information System. On a printout dated December 19, 1978, the impact wrench in question was listed at \$606.57. However, in the study of other cost data, it was found that this price was out of date. In fact, the January 1979 Management Data List (ML) shows this wrench at \$443.00, and the October 1979 ML shows the price reported above, \$379.00. The falling price seems to demonstrate that the re-writing of specifications, or better procurement procedures, can result in significant savings.

Typewriters

There are three different typewriters listed in the Table of Equipment for a 105mm howitzer battery (table 10). In the attempt to find commercial substitutes, examples of two other ways to save money on procurement for the military were discovered. They are to buy foreign-assembled typewriters either from firms, or from the governments themselves.

The military procurement price of \$544.50 for the electric typewriter was a price which the Marines received on a one-time-only bid for 600 typewriters in 1978.¹ They were produced in Italy.

¹ The information in the following paragraphs was obtained in telephone conversations with Mr. Jack Perlow, Director of Government Operations, Olivetti Corporation.

TABLE 10
TYPEWRITERS

Item	Commercial and/or GSA price	Initial purchase savings	% annual savings	Comment
Type A Font Electric	760.00	N O	S A V I N G S	Olivetti commercial and GSA price
13-Inch manual	175.00	36.65	17.3	Commercial is GSA price
Office supply set including 11-inch typewriter	150.00	NOT	DIRECTLY COMPARABLE**	

*Bought as a "consumable"

**We were unable to obtain information on how much the typewriter contributed to the price of the office supply set.

and overcame a small Buy American price differential.¹ Due to recent cost increases and currency revaluations, and in spite of the removal of Buy American rules on NATO products, the current multiple award² contract price for this typewriter is \$760. If Buy American provisions were waived, the previous military price could be met by importing typewriters assembled in Brazil.

The other two typewriters are currently being purchased by GSA from East Germany.³ They undersell U.S. manufacturers by approximately 20%. This is another way of saving money in procurement, though certainly not through competitive commercial procurement.

Fire Extinguishers

There are two types of fire extinguishers assigned to the battery. They offer one modest and one significant possibility for cost savings. These data appear in table 11.

The surprising prices here for the two 10 lb. dry chemical extinguishers have no immediate explanation. The Federal Supply Schedule (FSS) description for this item does not suggest any extra add-on items which would add to the price. The capability of the substitute to fight different kinds of fires surpasses the FSS requirements.

Even if these extinguishers were purchased by the dozen at the retail level -- delivered, installed, and tested -- the cost would be \$50.00 per unit. Clearly, this item deserves further examination.

Padlocks

The subset of equipment used in this study included two different kinds of padlocks. Attempts to locate exact duplicates for these locks at lower prices were unsuccessful. However, the question of whether lower quality items could be substituted for the military items was raised. The data collected is presented in table 12.

¹If there is a 50% Buy American price differential, a foreign-produced item which could be purchased for \$100 will enter the bidding as if it could only be purchased for \$150.

²A multiple award contract is one where buyers can order from any of a number of firms at fixed prices.

³This information is from phone conversations with the aforementioned Mr. Perlow, and with Ms. Mathews, the GSA buyer for these items.

TABLE 11
FIRE EXTINGUISHERS

15 lbs. CO₂ - \$76.00, quantity - 6, planned life - 10 years
 10 lbs. dry chemical - \$54.67, quantity - 23, planned life - 10 years

Item	Price	Initial purchase savings	% savings	Annual savings
General 15 lb. CO ₂	81.00	No SAVINGS		
Badger 15 lb. CO ₂	66.50	57.00	12.5	5.70
General 10 lb. chemical	28.00	613.41	48.8	61.34
Badger 10 lb. chemical	24.00	705.41	56.1	70.54

TABLE 12
PADLOCKS

Combination high security lock - \$19.90, quantity - 2, life - 5 years
 Pin and tumbler lock - \$1.50, quantity - 6, life - 2 years

Item	Price	Initial purchase savings	% savings	Average annual savings
High Security Sesamee by Corbin GSA 5340-00-292-0896	8.50	22.80	57.3	4.56
Pin and Tumbler GSA 5340-00-664-1323	5.50	28.80	72.4	5.76
	0.75	4.50	50.0	2.25

The military high security lock has a standard combination dial, with 30,000 possible combinations, and is resistant to openings by radiographic techniques. The commercial substitutes have combination locking mechanisms, but the mechanisms are less flexible, and more susceptible to surreptitious entry. The question is, for the kind of items held by a battery, are precautions against such entry necessary?

The same question applies to the pin-tumbler type padlock. If the lock is being used only against casual theft, there is every reason to believe that the less expensive warded mechanism lock would suffice.

Compasses

Another group of items about which there may be some question of the necessary quality level is magnetic compasses. For these items, exact duplicates were obtained, because our search led us to a supplier of military items. To the extent that the prices we received are accurate reflections of these firms' current practice, the military is receiving a competitive price on the items. This is shown in table 13.

The only questions to be raised about the purchase of compasses are whether a much less expensive compass would be a suitable replacement for the Stocker & Yale Lensatic compass, and whether the lensatic compass can replace the M-2 compass. Conversations with users in the training batteries at Quantico indicate such substitutions to be a real possibility for at least a subset of all their tasks. This would be a question for field tests or T & E.

Sleeping Bags, Mattresses, Cots, and Blankets

The responses for this equipment are mixed (table 14). The one new consideration that has been added is that two of the items, the pneumatic mattress and the folding cot, are produced under the aegis of the Committee for Purchase from the Blind and Other Severely Handicapped. They are not truly available for commercial substitution due to restrictive legislation that requires the military to buy these items through the Committee.

Sleeping Bags. These bags are all supposed to be useful down to 0°-10°F. However, they all have slightly smaller interior dimensions than the military specification bag (approximately 10%). If this larger size is necessary, then the savings would be smaller.

Another problem is durability of the potential substitutes. Both casual inspection, and discussion with people who use the commercial products for hiking and backpacking, indicate that its better

TABLE 13
COMPASSES

Compass M-2, price - \$70.10, quantity - 10, life - 15 years
 Compass Lensatic, price - \$17.57, quantity - 13, life - 10* years

Item	Price	Initial purchase savings	% savings	Average annual savings
Lensatic				
Stocker & Yale	17.50	0.91	0.4	0.27*
Above, w/case	19.00	N 0	S A V I N G S	
Precise	8.00	124.41	54.5	36.7*
M-2				
Brunton Pocket Transit	70.15	N C	S A V I N G S	

*For an item with a replacement factor of .24 and a planned life of 10 years, the mean time between failures is 3.39 years. For a further discussion of the derivation of this statistic, see Appendix D.

quality makes it the preferred alternative if it is as durable as the military equipment. This can only be ascertained through some form of test and evaluation.

Pneumatic Mattresses. Commerical responses indicate two new possibilities. The first is a short mattress designed to support the head and torso, but not the legs. The other is the possibility of using foam, rather than air inflation, as the support in the mattress. Backpackers and canoe campers often use the short mattress to minimize mattress weight and bulk. Foam mattresses are also used because of their greater durability and lower weight. Many of the users of the military equipment with whom we talked indicated that they often did not bother to bring an air mattress, since it would often develop a leak, and be more trouble than it was worth. Foam mattresses are immune from this problem. Therefore, they would almost certainly have a longer, more useful, life span. The one problem with a foam mattress is that it might add to an already bulky field pack.

Cot. The potential substitute reported in table 14 is of lower quality than the military item. In particular, inspection of the two show the substitute to be less durable. The only possibility of savings here would be if three of the commercial substitutes, used sequentially, could last longer than the one military item. This would indicate a lower life cycle cost.

Blankets. The blankets suggested by the firms are definitely different from the military blanket in one respect, and may be different in two others. The definite difference is that both the substitutes have man-made fibers in them, as opposed to wool only. The two possible differences are in the grade of wool used, and the efficacy of the shrinking and mothproofing processes applied to these blankets. It is not clear that these differences outweigh the lower cost of the commercial blankets.

Truck Maintenance Items

Although they are listed under General Supply, this equipment seems to be better described by the above title. None of the commercial items were priced as low as the military items (table 15).

Tents and Tarpaulins

The data on tents and tarpaulins are presented in table 16. Two items show significant savings which are worth further examination. They are the General Purpose Tent, and the Maintenance Shelter. The savings on the 14'x6' tarpaulin, while large, seems to be due to the lack of gas, oil and fire resistant treatment of the fabric.

TABLE 14
SLEEPING EQUIPMENT

Sleeping bag,
 intermediate cold : Price - \$59.00, Quantity - 126, Life - 5 years
Mattress, pneumatic : Price - \$13.40, Quantity - 126, Life*- 5 years
Cot, aluminum & nylon: Price - \$39.85, Quantity - 126, Life - 5 years
Blanket : Price - \$15.10, Quantity - 252, Life - 15 years

Item**	Price	Manu-fac-ture Price***	Initial purchase savings	% savings	Annual savings	Comment
Sleeping Bags:						
Bell (D)	54.00	46.00	1638.00	22.0	327.60	
Evans (D)	70.00	59.50	N O	S A V I N G S		
Bean Tapered (R)	77.25	46.35	1594.00	21.4	318.80	
Bean Mummy (R)	70.50	42.30	2104.20	28.3	420.84	
Mattresses:						
Stebco (M)	15.00	15.00	N O	S A V I N G S		
Bean (R)	18.00	10.80	327.60	19.4	141.21	Polyester foam
Stebco (M)	12.00	12.00	176.40	10.4	76.03	Shortened
Bean (R)	12.00	7.20	781.20	46.3	336.72	Short-foam (50")
Cot:						
All-Luminum (M)	11.90	11.90	3521.70	70.1	704.34	Probably not comparable
Blankets:						
American Woolen (M)	8.25	8.25	1726.20	45.4	115.08	90% wool
American Woolen (M)	9.00	9.00	1537.20	40.4	102.48	70% wool

*Peacetime replacement rate 0.324, mean time between failure 2.32 years
 **D = Discount retail, R = Retail, M = Manufacturer

***Retailers operate on a minimum 40% markup; that is, the wholesale price is at most, 60% of the retail price. Discount retailers operate on at least a 15% markup.

TABLE 15
TRUCK MAINTENANCE ITEMS

Item	Military Price	Civilian Price	Manufacturer
5-ton Automotive axle stand	\$ 17.84	\$ 50.75	Walker
4-ton Hydraulic jack	243.00	280.00	Weaver
4-ton Hydraulic jack	243.00	457.50	Walker
Truck wheel lift	312.00	451.00	Walker
4-ton Hydraulic hand jack	16.84	32.00	Walker (3-ton)
4-ton Hydraulic hand jack	16.84	32.00	Weaver (3-ton)
4-ton Hydraulic hand jack	16.84	38.00	Weaver (5-ton)

TABLE 16
TENTS AND TARPAULINS

<u>Tents</u>	<u>Item</u>	<u>Civilian Manufacturer</u>	<u>Civilian price</u>	<u>Initial purchase price</u>	<u>% saving</u>	<u>Average annual saving</u>	<u>Comment</u>
<u>Tents</u>							
Command Post, Octagon:							
Maintenance Shelter:							
Fly, Storage:							
Command Post (10' x 20'):							
General Purpose (16' x 32'):							
Tarpaulins							
14' x 6':							
26' x 22':							
<u>Tent, maintenance shelter</u>							
		Anchor (estimated)	1900.00	714.64	27.3	71.46	Military tent is approx. 200 sq. ft. octagon.
							Civilian tent is 14' x 16'
Fly, tent, storage tent, command post (10' x 20')		Anchor Fly Universal wall tent	240.00	N O S A V I N G S			
Tent, general purpose (16' x 32')		Anchor universal wall tent	950.00	N O S A V I N G S			
<u>Tarpaulins</u>							
14' x 6'		Humphreys Textiles	20.00	121.60	43.2	24.32	
14' x 6'		Sears	35.00	1.60	0.6	0.32	Not gas, oil or fire resistant
26' x 22'		Humphreys Textiles	155.00	N O S A V I N G S			

During the course of gathering these data, we discovered further examples of how overly restrictive specifications prevent the military from obtaining the best quality and price on tents.¹ They indicated that, while the purchasing and inspecting agents were generally helpful and easy to deal with, the same could not be said for specifications on various government contracts which they have examined.

The major restrictions this manufacturer complained about regarding tents were the specification of inputs and manufacturing procedures, and the use of out of date references to other manufacturers and suppliers of materials for these tents. One example of a specified input is that there is a requirement to use polyester thread, rather than the option to use a thread which has a polyester core and a cotton wrap. It was asserted that the latter thread can be fabricated so that it is as strong as necessary, and that it has the added advantage of swelling with the fabric to help prevent water leaks at the seams. The manufacturer uses this thread for all the tents they produce and considers it superior to plain polyester. Another example of specified inputs is that, in a recent specification, firms were required to use 32" wide goods to construct the panels in the tent. However, 43" goods were more readily available and required less stitching for a given tent. The example given by the manufacturer of a specification being out of date was that the firm suggested as the supplier of a specialized input for this tent had not made that item for years. This again shows that, even with hard working and competent specification writers, a detailed specification becomes outdated, therefore less useful, and more costly to meet.

In general, the individuals we contacted were more pleased with purchase descriptions, as the descriptions allowed them to make use of their expertise, and allowed them to be flexible in their choice of inputs.

Cold and Wet Weather Clothing

The data collected for this category are presented in table 17. Two items show extensive savings. However, the only way to find out if these items are acceptable substitutes in terms of quality and durability would be through testing and evaluation procedures, or a field test.

¹ Telephone conversation with Michael Miller and John Weber, Contract Sales Manager and Vice President, Contract Sales, respectively, for Anchor Industries.

Electric Drills

The responses for portable electric drills are presented in table 18. The responses are all significantly high on drill one, the 1/2 inch low speed drill, and the one response for drill two, the 1/4 inch right angle drill, is much lower than the military item.

Taken in isolation, the fact that the commercial and military prices differ widely could be taken as a sign that the drills are not good substitutes for one another. However, after observing the rapidly falling price of the pneumatic impact wrench discussed earlier, a field test of drill two seems indicated.

Soap and Detergent

The replies received for the general purpose detergent and paste soap grit are displayed in table 19. The results for the detergent appear promising, but not for the soap.

For the detergents, the important determinant of suitability for substitution is based on questions such as: do the users require a liquid as now indicated in the specification, or will a powder be equally effective; and the usage to which the cleanser will be put. As an example of the latter point, if it was necessary to avoid leaving a soap film, then an all detergent cleanser (Red Glo) would be required. If users actually use this "General Purpose" cleanser for unusually dirty or oily cleanup, then a less expensive heavy duty cleanser (Vaporine) could be used.

The important point to be made is that there is a spectrum of products available as substitutes. It is strictly a question of whether current procurement practice allows sufficient flexibility to tap this diversity.

Miscellaneous Items

The replies for six miscellaneous items are listed in table 20. The three items of interest are the electric lantern, the heat protective mitten, and the HD-448/U vacuum cleaner. Given the wide variety of electric lanterns available in the commercial marketplace, the only questions that have to be answered are whether the potential substitutes listed are in fact substitutes in use; that is, whether the military lantern is over-specified. The only question about the insulated mitten is whether the fabric is durable enough to withstand the use given by an artilleryman extracting shells from a howitzer. The users we interviewed did not feel the insulating properties of the commercial substitutes would be a problem. They indicated the mitten was often not used in situations which, at first, would appear to require heat protection.

TABLE 17

COLD AND WET WEATHER CLOTHING

Wet weather parka: Price-\$13.90, Quantity-126, Life-5 years
 Cold weather coat with hood: Price-\$8.90, Quantity-126, Life-5 years
 Liner for coat: Price-\$29.40, Quantity-126, Life-5 years
 Overalls, wet weather: Price-\$13.30, Quantity-126, Life-3 years

Item	Civilian price	Initial purchase savings	% saving	Average annual saving
Wet weather parka	8.00	743.40	42.4	148.68
Cold weather coat with hood	70.00	N O	S A V I N G S	
Liner for coat	27.00	N O	S A V I N G S	
Overalls, wet weather	8.00	667.80	39.8	222.60

*Peacetime replacement rate 0.204, mean time between failure 2.89 years.
 For more information see Appendix D.

TABLE 18:

PORTABLE ELECTRIC DRILLS

Drill one (1/2 inch low speed): Price-\$64.00, Quantity-0.8, Life-
 Drill two (1/4 inch right angle drill): Price-\$137.00, Quantity-0.5, Life-

Item	Civilian price	Initial purchase savings	% saving	Average annual saving	Comment
One	110.00	N O	S A V I N G S		AEG
One	145.00	N O	S A V I N G S		AEG
One	145.00	N O	S A V I N G S		Bosch
Two	70.00	67.00	48.9	67.00	AEG

TABLE 19

SOAP AND DETERGENT

Paste form soap grit: price-\$1.05, quantity-10, life-1 year.
 General purpose detergent : price-\$4.60, quantity- 6, life-2 years

Item	Civilian price*	Initial purchase savings	% saving	Average annual saving	Comment
<u>Paste</u>					
"Grit"(Sunshine Soap)		NOT DIRECTLY COMPARABLE			Cake form
"John D. Jr." (Walker Mfg.)	1.28		N O	S A V I N G S	
<u>Detergent</u>					
All purpose (Wilson Mfg.)	3.54	6.36	23.0	3.18	
Red Glo (Wilson Mfg.)	3.16	8.64	31.3	4.32	Heavy duty detergent only
General Purpose (Sunshine)	4.00**	3.60	13.0	1.80	
Vaporine (Wilson Mfg.)	2.00***	15.60	56.5	7.80	Heavy duty soap & detergent

* All Wilson prices are based on truckload shipping

** Only listed as available in a 6 gallon container. This price is manufactured based on price differences between 5-6 gallon containers, and four one-gallon containers in a case.

***This is a powder. The price is based on conversion to liquids. Estimates supplied by Wilson Mfg.

TABLE 20

MISCELLANEOUS ITEMS

6 Volt lantern: Price-\$6.86, Quantity-4, Life-3 years
 Siren, hand operated: Price-\$98.75, Quantity-1, Life-3 years
 Vacuum cleaner, HD-448/U: Price-\$167.89, Quantity-1, Life-10 years
 Men's cotton coveralls: Price-\$16.40, Quantity-12, Life-5 years
 Mitten, heat protective: Price-\$3.48, Quantity-12, Life-3 years
 Suitcase, center folding: Price-\$49.10, Quantity-15, Life-10 years

Item	Civilian price	Initial purchase price	% Saving	Average annual saving	Comment
6 Volt lantern	5.00	7.44	27.1	2.48	Sears
6 Volt lantern	5.00	7.44	27.1	2.48	Everready
6 Volt lantern	4.00*	11.44	41.7	3.81	
Siren, Hand operated	210.50	N O	S A V I N G S		
Vacuum cleaner, HD-448/U	138.94	28.95	17.2	5.79	
Men's Cotton Coveralls	18.00	N O	S A V I N G S		
Mitten, Heat Protective	3.09	4.68	11.3	4.68	
Suitcase, Center Folding	68.00	N O	S A V I N G S		

*Supplied through GSA

The suitability of the vacuum cleaner is difficult to ascertain for three reasons. First, the military specification requires a kit containing motor brushes and bearings to be included with the cleaner. This would have to be added to the substitute price to make it comparable. Second, one function of the cleaner is to dry equipment. To that end, the temperature rise between inlet and discharge is restricted to the range of 45-55°C.¹ The commercial substitute has a maximum temperature rise of 65°C. As long as this higher temperature did not damage the equipment, this would be an improvement. If this is a crucial specification, then the substitute may be unacceptable. Third, it should also be noted that, if the military price is based on a quantity buy of 24 or more, the proper price for comparison is \$122.27. This would be 27.2% lower than the military price, which would allow even more room for the possible extra cost of the above mentioned kits and other added items.

SENSITIVITY TO INCORRECT PRICES

The foregoing analysis is all based on the assumption that the prices collected through our survey are accurate. This could be a poor assumption for three reasons. One is that these are just estimates by the firms we questioned. There may be hidden costs or economies in purchase or inventory for given items. Second, commercial items may have to be modified to make them acceptable for military use, or kits or spares should be included in the commercial price. Finally, the firms surveyed may have quoted artificially low prices in the hope of tilting the study's results towards commercial procurement -- and a possible future military contract.

The standard way to attack this problem is to answer the question: What would the results of this study look like if the actual prices that would be charged vary systematically from the prices reported? Another way of saying this is: How sensitive are the results of the study to different prices? In table 21, we show the effect on the initial and annual savings of varying the commercial price from 50% below the reported quote to 100% above the quote. With two exceptions the commercial price used is the lowest price on each item for which any positive response was received.² Naturally, when the adjusted price of the commercial item is more than the military price, the item is dropped from the calculation.

¹Military specification MIL-C-21101A, "Cleaner, Blower and Vacuum, Portable, Industrial".

²The two exceptions are the 14'x6' tarpaulin, and the cot. The reasons for these exceptions are discussed in the text.

TABLE 21
SENSITIVITY OF COST SAVINGS TO SYSTEMATIC ERROR IN
COMMERCIAL COST ESTIMATES

% Actual commercial prices deviate from survey data	Initial purchase savings	Number of items offering savings	Average annual savings*	Percent change in annual savings**
-50	25,566	37	5,326	14.7
-40	22,322	35	4,595	17.0
-30	19,114	33	3,875	19.1
-20	16,122	28	3,200	20.8
-10	13,492	26	2,597	20.2
0	11,155	23	2,121	24.6
10	8,923	21	1,657	27.1
20	6,940	17	1,261	20.9
30	5,578	14	1,022	12.8
40	4,758	12	899	14.8
50	4,105	10	775	15.6
60	3,455	10	663	15.8
70	2,893	8	566	9.4
80	2,633	6	515	8.9
90	2,411	6	471	9.8
100	2,190	6	427	

*The discounted present value of the savings (10% discount rate, infinite time horizon) is the average annual savings multiplied by 10. For 10 year and 30 year time horizons, the multipliers would be 6.14 and 9.43, respectively.

**The formula for calculating these percentages is:

$$\frac{x_i - x_{i+1}}{\frac{x_i + x_{i+1}}{2}} \times 100 \quad i = 1, \dots, 15$$

where the X's are the average annual savings and subscript shows the table row.

There are several conclusions to be drawn from table 21. The first is that the existence of savings is insensitive to errors in the data. Even if the actual commercial prices are 100% above the estimates we gathered, some savings still exist. The second conclusion is that the amount of savings is very sensitive to systematic error in the commercial cost estimates. As can be seen from the column titled Percentage Change in Annual Savings, every one percent deviation between actual commercial prices and our estimates results in approximately a two percent change in annual savings in the area of \pm 20% deviation of actual from survey prices. Finally, the rows showing the actual price lower than the commercial price by 10% or 20% give a preliminary indication of purchase price savings available through quantity discounts.

DOD-WIDE SAVINGS

This study has used equipment directly assigned or distributed to a 105 mm howitzer battery, and calculated the potential cost savings from buying similar items through commercial channels. Two questions have yet to be addressed. The first is: What percentage of the total cost of provisioning a battery could be saved by these substitutes. The second is: What kind of savings would these lower costs imply if the commercial substitutes were purchased DOD-wide.

The answer to the first question is presented in table 22. As can be seen there, the percentage of the total initial cost of provisioning a battery with these substitutes is 5.4%, the average annual cost if 4.9%. The cost savings are only 1.5% and 1.0% respectively. These are very small numbers. However, as discussed earlier, the only area in which significant responses were received was General Supply. Within this general supply category the percentage dollar value of initial purchases for which a positive response was received is 31.2% and the percentage of the average annual savings is 20.7%. The cost savings as a percentage of initial purchase and average annual savings for the general supply category taken as a whole were 8.8% and 4.4%, respectively. Finally, the percentage cost savings of purchasing the lower cost positive responses as compared with the military cost of all positive responses were 28.4% (initial) and 21.1% (annual). We feel these percentages are acceptable given the extensive nature of this survey.

The question of how these lower costs for a single artillery battery translate into lower costs for DOD is difficult to answer. This is because the usage of many of these items varies dramatically throughout the Department of Defense. Usage can even vary between artillery batteries in the Corps, depending on whether they are deployed through the fleet, or are based in permanent structures on land. However, preliminary estimates can be developed.

TABLE 22
COST SAVINGS AND POSITIVE RESPONSES AS A PERCENTAGE OF TOTAL AMOUNTS

Military cost of positive responses	Cost savings from commercial procurement	Total*	General supply*	Positive responses as a percentage of total supply			Cost Savings as a percentage of general supply		
				% of total	% of general supply	% of total	% of general supply	% of total	
Initial expense	39,347	11,155	731,430	125,993	5.4	31.2	1.5	8.8	28.4
Average annual	10,030	2,121	205,500	48,463	4.9	20.7	1.0	4.4	21.1

*From table 3.

These estimates are listed in table 23 and 24. Table 23 shows cost savings based on the quantities demanded by all purchasers through the various DLA or GSA supply centers during fiscal 1979. The annual savings on each item for which there were savings vary from 8 dollars to 2.36 million dollars. The mean is \$252,055, and the median is between \$112-115 thousand dollars. The total savings on DOD-wide procurement of the commercial items is 23.8%. This figure is obtained by dividing average annual savings total in table 26 by the total annual procurement cost of the 32 positive response items on which we were able to get this data (See Appendix F, table F-5 for a complete list of the items and the annual quantities).

Table 24 shows the sensitivity of these DOD-wide savings to systematic variation in the prices. As can be seen from this table, savings persist even if the systematic error approaches 100%, that is, actual prices are double the quotes obtained by the survey. The cost savings nearer the top of the table, where the "actual" prices turned out to be lower than the prices reported in the survey, can also be used to see the kind of purchase price savings which could be obtained as a result of quantity discounts.

Finally, it should be noted that these data are the hypothetical savings for a single year. Discounting these savings to get the present value of the savings can increase the present value of the savings significantly. Certainly potential savings of this magnitude are worth further study.

TABLE 23
COST SAVINGS ON COMMERCIAL POSSIBILITIES DOD-WIDE

Item	1979 DOD-wide quantity*	Unit cost savings**	Average annual savings***
Fire Extinguisher 15 lb. CO ₂	1,527	9.50	14,506
Fire Extinguisher 10 lb. Chem.	10,103	30.67	309,858
3/4 in. pneumatic impact wrench	206	29.00	5,974
Drill, elec. port. 1/4 in.	3,105	70.00	217,350
Padlock, high security	40,011	14.40	576,158
Lantern, 6 volt	9,071	1.86	16,872
Compass	30,000	9.57	287,100
Watch, stop	8,699	12.89	112,130
Watch, wrist, complete	39,593	6.17	244,288
Blanket	386,956	6.10	2,360,431
Detergent general purpose	80,000	1.44	115,200
Tent, maintenance	66	714.64	47,166
Tarpaulin, 14'x6'	43	0.20	8
Tent, general purpose	250	166.80	41,700
Parka	45,345	5.90	267,535
Overalls	38,518	5.30	204,145
Mitten, heat protective	30,725	0.39	11,982
Drawers	16,837	1.00	16,837
Undershirt	186,612	0.95	177,281
Sleeping bag	1,121	13.00	14,573
			* 5,041,100***

*Information from CISP program (George Clark, DLA) and Bob McDaniel (DPSC, Philadelphia), for fiscal year 1979, and "The Stockage Improvement Report Master Cross Reference Listing, Part I".

**Military price minus civilian price.

***Average Annual Savings is the product of DOD-wide quantity and unit cost savings. It assumes that Fiscal 1979 was an average year.

****Components may not add to total due to rounding.

TABLE 24

SENSITIVITY OF DOD-WIDE COST SAVINGS TO SYSTEMATIC ERROR
IN COMMERCIAL COST ESTIMATES

% Actual commercial prices deviate from survey data	Items offering savings*	Average annual savings**	Percentage change in annual savings***
-50	29	11,811,956	14.4
-40	27	10,226,587	16.3
-30	27	8,683,025	18.2
-20	24	7,232,551	20.5
-10	21	5,888,333	16.0
0	20	5,041,100	17.9
10	18	4,212,277	19.2
20	13	3,474,201	20.6
30	12	2,825,793	24.1
40	9	2,218,771	27.0
50	7	1,690,542	35.2
60	7	1,184,134	42.8
70	5	766,673	14.7
80	4	662,013	14.8
90	4	570,956	17.3
100	4	479,899	

*The number of items listed here is less than the number listed in table 21. We were unable to get DOD-wide information on the missing items.

**The discounted present value of the savings (10% discount rate, infinite time horizon) is the average annual savings multiplied by 10. For 10 year and 30 year time horizons, the multipliers would be 6.14 and 9.43, respectively.

***The formula for calculating these percentages is

$$\frac{\frac{X_i - X_{i+1}}{X_i + X_{i+1}}}{2} \times 100 \quad i=1, \dots, 15$$

where the X's are the average annual savings and subscript shows the table row.

SUMMARY & CONCLUSIONS

SUMMARY

The purpose of this study has been to investigate the potential cost savings obtainable by the military through the purchase of commercial, "off-the-shelf", equipment, rather than purchasing through the process of procuring to military design specifications. There are two features which make this study different from most other studies in this area. One is its attempt to rely on low quality data to indicate potential savings. The other is that the study has been constructed so as to facilitate a field test of candidate equipment.

The organization of this study consisted of three major parts. The first was a background section where the motivation for this study and the results of past studies were discussed. The second part discusses the plan of study. This consists of identifying the unit of analysis, and explaining the basic methods to be employed. The third major section discusses the problems encountered by this study, the savings that could be obtained for various specific items, and what these savings could mean if they were obtainable on a DOD-wide basis.

CONCLUSIONS

We feel there are several conclusions which can be drawn from this study. They deal with: the potential for cost savings, the value of this technique for showing cost savings, and two suggestions for further study in this area.

There are many potential cost saving items presented in this study. Given the emphasis on direct delivery purchase of commercial substitutes and small dollar volume transactions maintained throughout, the study means that these savings should be looked upon as the minimum savings possible among the subset of items under consideration. If the kinds of cost savings found among our 500 item sample can be generalized into the thousands of items procured for DOD, the potential savings are substantial.

The second conclusion is that this extensive technique of information gathering has validity as a low cost method to get information on potential cost savings. This is not a method which will replace more intensive testing and evaluation. But it can be useful in directing the attention of procuring agencies to areas where savings may be available.

A third conclusion is that several of the items discussed in the last section need further study. The two obvious methods for such study would be a field test, or testing and evaluation through

existing channels. For general supply items similar to those discussed here, we feel a field test has advantages. The expense of field testing expensive items such as trucks, the necessity of exposing such items to a wide variety of weather conditions, terrain, and load, and the generally technical nature of such tests, make standard T & E seem a preferable solution. However, items such as underwear, lanterns, and sleeping bags seem to be items which have to be lived with, kicked around, and beat up by a random selection of average users to determine their usefulness and durability. They are not critical to unit performance nor expensive when purchased in test-batch quantities. Therefore, a field test would not be particularly expensive.

A final conclusion and recommendation is that some way should be found to make gathering information on commercial substitutes an on-going activity. Suppliers have both the knowledge and incentive to suggest alternative techniques and substitute products. Item managers and purchasing agents have the detailed knowledge to appreciate these suggestions, but not necessarily the incentives and/or the channels to pass this information to those who write specifications and mandate requirements. We suggest that an incentive structure and an institutional framework be developed to facilitate the gathering and dissemination of this information.

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APPENDIX A
RECENT GAO REPORT

APPENDIX A
RECENT GAO REPORT

Source: Report to the Congress of the United States by the Comptroller General: "Recommendations of the Commission on Government Procurement: A Final Assessment" PSAD-79-80, May 31, 1979, GPO, p. 48-53. Noted as reference 2.

Exercising its oversight function, GAO prepared this report. One of the chapters (8) is entitled, "Much Remains to be Done in Commercial Product Reform". A simple summary of the position taken on commercial commodity acquisition in the report is as follows.

..."The OFPP [Office of Federal Procurement Policy] has broken new ground with a policy to eliminate unnecessary Government specifications, to purchase off-the-shelf commercial products, and to use commercial distribution systems. Although there have been some significant individual buys of commercial products, Federal agencies have been slow to respond and key actions are still required to fully integrate the policy into procurement practice."

We have created table A-1 by combining two figures from the GAO report, and listing only the specific areas in which we are interested, to summarize recommendations made and actions taken.

Some of the activities which have occurred are...discussed elsewhere in this report.¹ However, "Action to date...is more like feasibility testing than policy implementation...In DOD, a limited number of buys have been made...At the beginning of 1979, GSA had not made any buys as part of its implementation of the policy."

According to GAO, there are several "key actions still required."

The four which relate directly to this study are:

- 1) "Linking commercial products procurement with greater use of commercial distribution systems..." because "[A]gency programs for making test buys of commercial products are

¹See material on ADCP and CCAP in the Background section.

TABLE A-1
COMMISSION COMMERCIAL PRODUCT RECOMMENDATION AND
EXECUTIVE BRANCH ACTION

<u>Recommendation</u>	<u>Reason</u>	<u>Action Taken</u>
D-2 Get user feed-back on supply support system	To reevaluate how well supply support systems serve the user	Accepted; issued a Federal Management Circular placing responsibility on individual agencies. No OFPP follow up
D-3 Limit Federal specifications for commercial products	Specifications too complex for need; inhibit or exclude use of commercial products. Result is more expensive, less innovative, and lower quality products	Accepted; OFPP issued Commercial Products Policy in 1976. Agencies slow to respond
D-6 Evaluate alternative procurement and distribution systems on a total cost basis (including decentralized buying); institute industrial funding	To achieve greater economy and user satisfaction in procuring, storing and distributing commercial products	Accepted in principle; OFPP partially implemented through Commercial Products Policy issuance

separate from programs to assess whether Government warehouses are needed to stock the items."¹

2) Developing the proper model and organizational structure to assure effective market research." This means getting better information on the demands of users and the capabilities of suppliers.

3) "Giving sufficient resources and attention to reviewing existing specifications."

4) "Restricting Government specifications to purchase descriptions." Except where necessary, keep the description short, output oriented and self-contained.

Another point made by the GAO report is that in comparing costs of commercial procurement and distribution with the current system, GSA is limited by statute in the amount of its costs which can be passed on to customers. This can mean that the full cost of existing procurement methods are not explicit, but are lumped together in what businessmen would call overhead. For the purposes of this study, this indicates that the current military price of a given item should be thought of as a cost estimate which is either just right or too low. All other things equal, the same observation would then apply to potential cost savings.

We would like to highlight how this study attempts to address some of GAO's concerns. In particular, 1) data has been collected which bears on the question of integrating the study of procurement and distribution systems, 2) this study is designed to locate commercial substitutes and, when combined with a field test, would identify user needs and acceptance of the commercial items, 3) by surveying items available commercially, it can give guidance to possible areas for specification review and 4) specification simplification.

¹ It is not clear that this is necessary until both procurement and distribution have been studied separately. For example, possibly all the savings found in such a test might come only from the procurement side. Therefore, if the test was an integrated one, it might be difficult to determine this fact. On the other hand, such a test might eventually be valuable if there are savings which occur only when both commercial procurement and distribution procedures are followed.

APPENDIX B

**MILITARY ADAPTATION OF COMMERCIAL ITEMS (MACI):
LIGHT TRUCKS**

APPENDIX B

MILITARY ADAPTATION OF COMMERCIAL ITEMS (MACI): LIGHT TRUCKS

This appendix looks in detail at a particular DOD project to buy commercial products as substitutes for items designed and built specifically for military use.¹ The last old style design specification for trucks in the 3/4-5/4 ton truck range was developed in the late 1960's and 1970. In 1971, the contract for this truck, the XM705, was awarded to the Chevrolet Division of General Motors. The cost was to be \$5400 per unit. At about that point, Kaiser-Jeep (now AM General) submitted an unsolicited offer for a similar, but basically commercial truck at the price of \$4400. This caused a major reassessment of this program and, when the smoke cleared, the result was a large purchase of a modified pickup truck manufactured by the Dodge Division of Chrysler Motors (called the M880). This was not accomplished until 1975, yet the price of this truck was \$3800. Not only did the basic truck have a lower price, but it came with radial tires, electronic ignition, and an automatic transmission. These items had become state-of-the-art after the original specifications had been promulgated, and were not included on the XM705.

Unfortunately, the above benefits were not purchased without some cost. For example, part of the price cut between 1971 and 1975 came because the standard M880 was delivered without a 24V kit that allows it to power various communications equipment. Also, the frame of the XM705 was designed for high mobility use and was therefore more suitable for cross country travel. Finally, some users complained that, due to lower ground clearance and the current configuration of the drive shaft and axles, kits including skid plates, grill guards, and a locking rear axle would be required to give the mobility necessary for tactical military use. There has also been some complaints that the truck is not designed to be tied down for shipment.

In partial response to these criticisms, it was pointed out that DOD had the option of making the electrical and rough terrain additions could only on those vehicles likely to need them.² This would allow these cost savings without degrading mission capability. Only a very small percentage of all mileage driven

¹ Unless otherwise noted, the material in this section was summarized from telephone conversations with Mr. Tom Webb of Tank Automotive Research and Development Command (TARADCOM).

² Also, the add-on nature of the 24 volt system makes it easier to cannibalize.

came in rough terrain. The services have a high mobility vehicle, the Gama Goat (M561), which is designed specifically for rough terrain; it has been argued that the Gama Goat should be saved for these tasks, with the M880 doing the rest of the work. This point of view is supported by the fact that, in 1975, three M880's could be purchased for the price of one Gama Goat.

Further testing of pure off-the-shelf light trucks and jeep-type vehicles was also undertaken in 1976 and early 1978. The user feedback from these tests, which used the M880 and M151 for baseline comparisons, indicated that, with the exception of a few undemanding rear echelon support duties, the use of unmodified commercial vehicles is not feasible.

Table B-1 shows an estimate of the savings gained from buying commercial as of 1975.

TABLE B-1

COST SUMMARY -- 1975

	Then-current prices	Price difference 1971	Price difference 1975 dollars*
XM705	\$5400	\$1000	\$1330
M715	\$4400		
M880 (with 24V)	\$4400		
M880's purchased**	40,000 <u>x</u> 1330		
Cost savings	\$53,200,000		

*Price Indices from Business Statistics 20th Biennial Edition, 1975, U.S. Department of Commerce 1975 and the current issues of Survey of Current Business, U.S. Department of Commerce, 1979

**A total of 44,000 units were purchased, but some went to foreign governments.

This saving is even more pronounced if one inflates these figures into 1980 dollars, as is done in table B-2. Inflating to 1980 dollars is particularly enlightening because a purchase of 60,000 M880-equivalent trucks is being contemplated.

TABLE B-2
COST SAVINGS SUMMARY -- 1980*

	Price difference 1971	Price difference 1980 dollars**
Projected purchase	\$1000	\$1950
Cost savings		<u>x 60,000</u>
		\$117,000,000

*Assumes a 10% rate of inflation from mid-1979 to mid-1980

**Price indices as above

Other feedback that supports the use of modified commercial vehicles was gathered by the authors during interviews with users¹. The users had two major points to make. The first was that they used support configured M880's for tasks which were equivalent to nonstrenuous tactical use. This included significant off-road travel. While admitting they did not have to force the vehicles to travel over certain terrain, as one would in combat, they found that operator training was much more important than skid plates and ground clearance in preventing getting stuck. Also, based on experience in combat areas², it was asserted that a significant proportion of the tactical force would never be required to do the kind of high mobility maneuvers that would separate even an off-the-shelf version of the M880 from a design specification vehicle.

However, since this report uses a Marine Corps unit as the unit of observation, it should be pointed out that some such units face special problems in the use of commercial vehicles. In particular, amphibious maneuvers present problems which preclude commercially produced vehicles from being considered suitable substitutes for those built to design specification without significant, expensive, modification.

In an independent investigation, another group within the Center for Naval Analyses, the Marine Corps Operations Analysis Group, has been gathering estimates on the costs of replacing M880's, M151's

¹Lt. Fearn and Sgt. Antonik of the Quantico Base Camp Motor Pool.

²Sgt. Antonik

(Jeeps), and Gama Goats with identical vehicles, or with a new High Mobility Multipurpose Wheeled Vehicle (HMMWV). The HMMWV is designed to be as good as the Gama Goat (see reference 9). The estimates appear in table B-3.

TABLE B-3:

COST ESTIMATE FOR 5/4 TON TRUCK CANDIDATES
(1981 dollars)

Vehicle	Price
M561	\$35,000
M880	\$10,000
M151 (and trailer)	\$16,000
HMMWV	\$25,000

These prices are estimates drawn from disparate sources. Except for the M880, the precision of these estimates is low. However, they are indicative of the large cost differences between purchasing to a military design specification, and buying and modifying a commercial vehicle.

Multiplying the \$15,000 price difference between the M880 and the HMMWV by the potential quantity buy of 60,000 units, yields a saving of 900 million dollars.¹ This is an upper bound on the potential savings. There would certainly be some applications, such as the amphibious operations mentioned above, where the value of the higher mobility vehicles outweighs their higher cost. However, the large cost difference makes this an area worthy of detailed consideration.

Other considerations in a comparison between design specification and commercial equipment are the maintainability and availability of the candidate equipment. As mentioned throughout this study, we are unable to give solid data on those characteristics because this study is in preparation for some sort of test and evaluation procedure. However, there have been several such studies done comparing the M880 to the M561. The results of one such study (reference 10) are summarized here.

This study supports the hypothesis that the design specification vehicle, the M561, is superior when there are severe adverse grades, particularly bumpy terrain, or where fording or swimming is required, and areas where the ground was particularly soft or sandy (though this is partly due to the tires currently supplied with the

¹This estimate of potential savings is not reported in the main body because of its speculative nature.

M880). Also, the M561 could be transported by helicopter, the M880 was not equipped for this procedure.

The M880 was superior to the M561 on any roads, improved or unimproved, and was able to carry more people. The M880 was as good as the M561 in less demanding off road conditions.

In every case reported, the M880 was superior to the M561 in the area of maintenance and reparability. For example, table B-4:

TABLE B-4

MILES DRIVEN AND DAYS DEADLINED FOR M880 AND M561

	<u>Miles driven</u>	<u>Days deadlined</u>
M880	57,643	236
M561	12,192	832

Dividing miles driven by days deadlined shows that the M880s were driven 244 miles per day deadlined, while the M561 was driven 15 miles per day deadlined. This is a ratio of approximately 16 to one. Those who reported average mileage driven between failures showed a ratio of between three to one and 12 to one in favor of the M880. This seems to indicate that not only were there more failures per mile driven by the M561, but that each one took longer to fix. Among those who reported downtime due to mechanical failure in days per month, the M880 had no failures, while the M561 was down between 16 and 50 percent of the time, with the average at approximately 30 percent.

We feel that the most important inference to be drawn from this data is that design specification and significantly higher purchase price do not guarantee a more durable or maintenance-free product. This reinforces our recommendation for a field evaluation of potential commercial substitutes for items such as the General Supply items examined in the main text.

APPENDIX C
DATA SOURCES

APPENDIX C
DATA SOURCES

1. List of all equipment carried by a Marine 105 mm howitzer battery, with Table of Authorized Material identification, quantity assigned or used.
 - a. Table of Equipment for M-1103 105 mm Howitzer Battery, Direct Support, Artillery Battalion, Artillery Regiment, Marine Division, Fleet Marine Force.
 - b. Magnetic tape listing all consumables used by 10th Marine Artillery Regiment, Activity Usage Accounting File (AUAF). Contact: Capt. Motes, Supply System Analyst, Supply Management Section, (LMM-2), Headquarters Marine Corps.
2. National Stock Numbers, replacement factor (if any)
 - a. United States Marine Corps, "Table of Authorized Material, Revision No. 5", Unclassified, 7 December 1978 (NAVMC 1017)
 - b. Magnetic tape listing all consumables (see above).
3. Specification number or drawing number, and the number which identifies the manufacturer.

Consolidated Master Cross Reference List (MRCL, C-RI-2), Unclassified, January 1979, Defense Logistics Service Center, Battle Creek, Michigan 49016

4. Military unit price:
Marine Corps Management Data List (ML-MC), Unclassified, October 1979, Defense Logistics Service Center, Battle Creek, Michigan 49016.
5. Planned life - obtained by conversations with item managers.
6. Individual Specifications
 - a. Complete military specification name. "DoD Index of Specifications and Standards", Unclassified, Naval Publications and Forms Center (January 1979)
 - b. Complete military specification:
Naval Publications and Forms Center
5801 Tabor Avenue
Philadelphia, Pennsylvania 19120

- c. Federal Item Identification
Federal Item Logistics Data Record (FILDR), October 1979
Defense Logistics Service Center
Battle Creek, Michigan 49016
- 7. Current manufacturer
 - a. Catalog and Handbook H 4-2 Series, Defense Logistics Services Center, Battle Creek, Michigan
 - b. GSA Items
 - 1) Federal Supply Schedule: Program Guide, July 1978
 - 2) GSA Supply Catalog, Guide, Government Printing Office, Washington, D.C., January 1978
- 8. Addresses of potential manufacturers of commercial substitutes
 - a. Thomas Register, Thomas Publishing Co., New York, 1979.
 - b. Letters and phone conversations generated from search
- 9. Price of substitutes: answers to inquiries.

APPENDIX D
YEARLY COSTS

APPENDIX D

YEARLY COSTS

Aside from the problems mentioned in the body of the report, there is another complicating factor in our efforts to obtain a yearly cost figure for each item. This is due to the three different methods of measuring the effective life of an item. This is best shown by enumerating the three classifications.

For 40 percent of the items, the method is simple. We are given a figure which is called the planned life of the item; that is, all items are assumed to last this length of time. Given that information, the average proportion of the item replaced in any given year is simply the reciprocal of the planned life. This is nothing more than straight line depreciation. For example, if item A is issued to the battery, and its life is 10 years then, in an average year, one tenth of the items will be replaced. Even if the items were all issued in the same year, this is a standard accounting simplification to allocate cost. It could also be defended on the basis of a "steady state" argument. That is, after many years of issue, items would be being replaced at different times so that, on average, a proportion equal to the reciprocal of the planned life is being replaced.

For 50 percent of the items, there are no figures on life span. The only information available is the amount used in one year. This is assumed to be the average amount.

For the remaining 10 percent, the calculation of yearly cost is more difficult. Not only is there a planned life span, but there is also the possibility of a catastrophic failure. For example, the planned life of a truck may be 15 years. However, it is also possible that, during training or exercises, a truck might be driven off a cliff or otherwise be ruined. This indicates that the mean time between failures will be less than a simple look at the planned life of the item would indicate.

The following model was derived using reliability theory with the help of Cdr. James Bagby.

If an item had an infinite planned life, and the possibility of random catastrophic failure, then the failure process might be modeled as a Poisson process¹, with the exponential density function

¹ Especially if catastrophic failure is generally caused by factors external to the item (e.g. carelessness)

$$f(t) = he^{-ht} \quad 0 < t < \infty ,$$

where the parameter h represents the failure tendency expressed in failures per unit time. Adding to our consideration the fact that, after a certain number of years (the planned life), the item is removed from service regardless of its condition, gives the process

$$f(t) = \begin{cases} he^{-ht} & 0 < t < b \\ e^{-hb} & t=b \end{cases}$$

where b is the planned life.

This process has the above mixed probability density function, and the mean of any such function in general terms, is

$$= \int_0^{\infty} tf(t) dt$$

which, in this case is

$$= \int_0^b t he^{-ht} dt + be^{-hb}$$

Using integration by parts,

$$= \int_0^b u dv + be^{-hb} = uv \Big|_0^b - \int_0^b v du + be^{-hb}$$

where $u=t$, $dv=he^{-ht}dt$, $du=dt$ and $v=-e^{-ht}$. Therefore,

$$\begin{aligned}& = -te^{-ht} \Big|_0^b - \int_0^b -e^{-ht}dt + be^{-hb} \\& = -be^{-hb} - \frac{1}{h} e^{-ht} \Big|_0^b + be^{-hb} \\& = -\frac{1}{h} e^{-hb} + \frac{1}{h} \\& = \frac{1}{h} (1-e^{-hb}) .\end{aligned}$$

It might seem that we could take this μ , the mean time between failures, and use it in the same way we used the deterministic planned life. That is, the proportion of the items replaced in one year would be the reciprocal of μ . We could then multiply this number by the number of items assigned to the unit to determine the number used up in an average year.

That is not the case for three reasons. The first is that this does not take into account the initial quantity assigned to the unit. In this study, this is accounted for by allocating the cost across the planned life. The second is the question of scrap value. Our calculations assume the scrap value is zero.

The final reason is that we have taken an expectation of a random variable, and the expectation of the inverse of that variable is not the same as the expectation of its reciprocal. That is,

$$\frac{1}{E[x]} \neq E[\frac{1}{x}] .$$

It is this second expectation which is the quantity used in our calculation of the number of items used per year. Not only are

these two expectations unequal, but strictly speaking, the second one is undefined for this process. Fortunately, the situation is not as bleak as it appears. This can be seen by noting that we want to consider the average time between failures through the life of the whole system. In this case, attention is directed at

$$E\left[\frac{1}{T}\right]$$

the expected value of the inverse of the average life of all the items of one type, and whether that is a useful statistical result. For example, if the item in question was a truck, and there were ten trucks assigned to a unit, then \bar{T} would be the average life span of those ten trucks.

In this case,

$$\bar{T} = \frac{1}{n} \sum_{i=1}^n T_i, \quad n = \frac{ml}{\bar{T}}$$

where

T_i is the life of each item,

n is the number of items purchased,

l is the length of time a kind of item is kept in service until obsolescence,

\bar{T} is the average failure time

m is the number of units operated simultaneously (i.e., maintained in the inventory)

If n is large enough then,

$$\bar{T} \sim N(\mu, \frac{\sigma^2}{n}) .$$

This means that

$$E\left[\frac{1}{\bar{T}}\right] \rightarrow \frac{1}{\mu} \text{ as } n \rightarrow \infty,$$

in fact the approach is quite rapid.

In this case,

$$E\left[\frac{1}{\bar{T}}\right]$$

can be evaluated either by numerical integration of the normal density function, or approximated using a Monte Carlo equipment. The latter method was chosen because it offered the easiest interface with the computer program used to calculate yearly cost.

APPENDIX E

FORMS

APPENDIX E

FORMS

As previously stated, the method used in this study was to try to get certain basic information from firms about the items in the subsample. These are the materials sent to firms.

COVER LETTER

This actually took a surprising amount of effort because it was felt to be necessary to conform with section 1-309 of the Armed Services Procurement Code in case people mistakenly thought CNA was a procuring agency. Section 1-309 requires that any federal agency which is asking for price quotations without an intention to purchase be absolutely explicit about their intent. The necessary disclaimer is embodied in the second paragraph.

MAILING SUMMARY

Though most of our positive responses came on an item by item basis, a list of related items was also sent in case the firm produced them also.

FILDR ENTRY

Whenever possible, a copy of the Federal Item Logistics Data Record was sent. The only exception to this was when a complete Military Specification was available.

MILITARY SPECIFICATION

A complete specification was enclosed if it was available to us. The example here was picked for its brevity. The average specification was approximately 20 pages.

AD IN COMMERCE BUSINESS DAILY

Late in the course of the study, it was suggested that such an advertisement might generate some unexpected response. Since it was not very costly, the attempt was made. Unfortunately, there was almost no response.

IDENTIFICATION SHEET - COMMERCIAL PRODUCT SUBSTITUTE

This shows the data we were trying to elicit from the firms. The major points of interest are:

- What the company in question perceives as a substitute item

- The prices and delivery charges at various quantities
- If they have read the specification, or had experience as a military supplier, what differences are there between the military specification item and their substitute
- Approximate order time
- A catch-all question to allow the companies to reveal any other information they might perceive as useful to us

IDENTIFICATION SHEET - COMMERCIAL PRODUCT SUBSTITUTE

This shows a completed form. Most forms were completed in a much less detailed fashion.

CENTER FOR NAVAL ANALYSES

2000 North Beauregard Street, Alexandria, Virginia 22311 Telephone: (703) 998-3600



COVER LETTER

31 August 1979

Company address and salutation

We are searching for savings that might result from procuring equipment for tactical units of the Armed Forces from the selection normally in the commercial market. This would be a change in procedures from developing items to meet complete government specifications. Therefore, we need to be informed of the availability and price of substitute items. Those being considered that might be included in your product line are shown on the attached enclosure, and some may be described in more detail in accompanying specifications. If you manufacture items which you feel are close substitutes for the products listed, we would appreciate it if you would complete a copy of the enclosed form for each item and return it to us by September 21, 1979.

The information we seek is for informational and planning purposes only. We do not have the authority to award a contract on the basis of this quotation, and we cannot offer to pay for the information solicited. However, we plan to recommend that the next step in analyzing increased commercial commodity acquisition be to purchase some of the items identified as potential substitutes in order that they be tested in tactical units to determine how well the commercial items can meet military requirements.

If you have any questions or requests for further information, please do not hesitate to contact Bruce Angier at (703) 998-3715.

Sincerely,

**STANLEY A. HOROWITZ
Director
Readiness & Logistics Division**

Enclosures

an affiliate of the University of Rochester

MAILING SUMMARY

6850-00-9857166	TABLET-WATER PURIFICATION	MILT283
7310-00-2856155	STOVE-GASOLINE-BURNER-W/CASE	MILS10735
8460-LC-5145415	CASE-MAP AND PHOTOGAPH	MILC21592
8665-00-2616999	BAG-WATERPROOF-CLOTHING	MILB3108
1290-0-614008	CIRCLE-AIMING-M2	SBJC554
1240-00-5300974	BINOCULAR-7X50 L/E	813656TYPEM1
7240-00-0893827	CONTAINER-WATER-PLASTIC	MILC43613
6260-0-6696636	LATERN SET-GASOLINE	SL3-00402A
6230-00-4929408	LATERN-ELECTRIC-6V	ML00200

FILDR ENTRY

8340-00-670-6712 QW QW 70006 MCBA824 1 LCC N T23700 10210
NAME ITEM NAME TARPAULIN
MATERIAL COTTON DUCK
AKRR CLOTH WEIGHT 16.77 OUNCES PER SQUARE YARD
NOMINAL
ABYT COATING MATERIAL VINYL RESIN
ABDY COATING MATERIAL LOCATION ... BOTH SIDES
ATRR MAXIMUM COATED CLOTH WEIGHT . 25.000 OUNCES PER SQUARE YARD
AJCB HAZARD PROTECTION FEATURE ... FIRE RESISTANT AND
GASOLINE RESISTANT AND
MILDEW RESISTANT AND
WATER RESISTANT AND
WEATHER RESISTANT AND
OIL RESISTANT
HUES COLOR OLIVE DRAB
AJNG SHAPE SOURCE US ARMY
AJWJ SHADE IDENTIFICATION 7
ABYT LENGTH 14.000 FEET NOMINAL
ABGL WIDTH 6.000 FEET NOMINAL
ATSG TIE ROPE INCLUDED
AGS1 GROMMET INCLUDED
ATSR RAINWATER COLLECTING DEVICE . NOT INCLUDED
SR-1 SPEC/STD CONTROLLING DATA
MANUFACTURERS CODE 81349
NON-DEFINITIVE GOVERNMENT
SPEC/STD REFERENCE MILT82152

FF-P-11CF
December 16, 1970
SUPERSEDING
Fed. Spec. FF-P-11OE
April 14, 1967

FEDERAL SPECIFICATION

PADLOCK, CHANGEABLE COMBINATION
(RESISTANT TO OPENING BY MANIPULATION
AND SURREPTITIOUS ATTACK)

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers changeable combination padlocks of both dial and push button designs. The padlocks are of exposed and concealed shackle types and are required to resist opening by surreptitious and manipulation techniques for the periods of time specified herein. The padlocks are intended for use as specified in 6.1. The padlocks have no forced entry requirements.

1.2 Classification. The padlocks shall be of the types and classes specified (see 6.2).

1.2.1 Types.

- Type DC - Combination dial design (concealed shackle).
- Type DE - Combination dial design (exposed shackle).
- Type PC - Combination pushbutton design (concealed shackle).
- Type PE - Combination pushbutton design (exposed shackle).

1.2.2 Classes.

- Class 1 - 30 minutes resistance to opening by radiographic techniques.
- Class 2 - No requirement for protection against radiographic techniques.

2. APPLICATION DOCUMENTS

2.1 The following documents of the issues in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

Federal Specifications:

- QQ-Z-363 - Zinc-Base Alloy; Die Castings.
- UU-P-553 - Paper, Wrapping Tissue.
- PPP-B-566 - Boxes, Folding, Paperboard.
- PPP-B-585 - Boxes, Wood, Wirebound.
- PPP-B-591 - Boxes, Fiberboard, Wood-Cleated.
- PPP-B-601 - Boxes, Wood, Cleated-Plywood.
- PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
- PPP-B-636 - Boxes, Fiberboard.
- PPP-B-640 - Boxes, Folding, Fiberboard, Corrugated, Triple-Wall.
- PPP-B-665 - Boxes; Paperboard, Metal Stayed (Including Stay Material).
- PPP-B-676 - Boxes, Setup.

Federal Standards:

- Fed. Std. No. 123 - Marking for Domestic Shipment (Civil Agencies).

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, D. C., Atlanta, Chicago, Kansas City, Mo., Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, Washington.

FSC 534C

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specifications:

MIL-L-10547 - Liners, Case and Sheet, Overwrap, Water-Vaporproof, or Waterproof, Flexible.

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by contractors in connection with specification procurement functions should be obtained from the procuring activity or as directed by the contracting officer.

2.2 Other publications. The following documents form part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

National Motor Freight Traffic Association, Incorporated, Agent:

National Motor Freight Classification.

(Application for copies should be addressed to the National Motor Freight Traffic Association, Inc., Agent, 1616 P Street, N. W., Washington, DC 20036.)

Uniform Classification Committee, Agent:

Uniform Freight Classification.

(Application for copies should be addressed to the Uniform Classification Committee, Tariff Publishing Officer, Room 202 Union Station, 516 W. Jackson Blvd., Chicago, IL 60606.)

3. REQUIREMENTS

3.1 Qualification. The padlocks furnished under this specification shall be products which have been inspected and tested, and passed the qualification requirements specified in section 4 and have been listed on or approved for listing on the applicable qualified products list (QPL).

3.1.1 Qualification suspension.

3.1.1.1 Development of opening techniques. Continuous tests of qualified padlocks will be conducted by the Government for the purpose of determining whether the protection afforded by the padlock should or can be improved. If, at any time techniques are developed within the framework of this specification which reduce the security protection of the padlock, the item shall be removed from the QPL and the manufacturer shall be required to modify the padlock to overcome the techniques so he may submit it for requalification.

3.1.1.2 Change in specification requirements. This specification will be continually reviewed by the Government for the purpose of determining whether design features of the padlocks should or can be improved. If, at any time the specification's requirements are changed to improve the quality of the padlock and such changes are to the extent that the manufacturer's product no longer conforms to the specification, the item shall be removed from the qualified products list and the manufacturer shall be required to modify the padlock to the extent he may submit it for requalification.

3.2 Materials. Padlocks shall be of not less than the quality of the materials specified herein. Materials not definitely specified shall be of the quality normally used in good commercial practices and shall be suitable in every respect for the purpose intended.

3.2.1 Metal components. The padlock case, cover, and internal parts subject to wear with the exception of the locking bolt shall be of brass, bronze, or zinc alloy. Shackles of the exposed shackle type locks shall be of case hardened or stainless steel, except that padlocks for shipboard use, when specified, shall have shackles of brass or bronze (see b.). Shackles of the concealed shackle type may be of zinc alloy.

3.2.1.1 Zinc-base alloy. Zinc alloy for parts shall conform to Composition A of QQ-Z-363.

3.3 Construction. The padlock shall be positive in its movements and functions, and the arrangement and fit of parts shall be such that it shall not be possible to insert a probing device into any opening in the case that would result in opening the padlock. The padlock shall be finished and assembled in such a manner that when in the locked condition, any penetration or spreading attempt, or the prying out or removal of component parts, including the combination dial, push buttons, or the back cover or any

part of the lock's case shall permanently distort and visibly mark the padlock and prevent the reattachment of the components (the provisions in 4.4. shall apply in making this determination). It shall not be possible to release the shackle of the exposed shackle type lock by tension applied between the padlock shackle and case, without completely impairing the lock to an inoperable condition. The padlock shall be designed and constructed so that it cannot be opened by manipulation or surreptitious attack. The padlock shall withstand the tests in section 4.

3.4 Dimensions.

3.4.1 Exposed shackle type. The outside dimensions across the shackle shall be 1-1/2 inches \pm 1/8 inch and the space under the shackle shall be of sufficient size to fasten around a 3/4 inch diameter bar. The cross sectional area of the exposed portion of the shackle shall be not less than .076 square inches and its thickness not less than .31-inch or more than .36-inch. The length of the padlock when locked shall be 4 inches \pm 1/8 inch. The width or thickness shall not exceed 2-3/4 inches.

3.4.2 Concealed shackle type. The recess in which the shackle bolt operates shall accommodate either an inverted shackle or a staple having an outside width of not more than 1-1/8 inch, an internal width of not less than .36-inch, and a thickness of not more than .26-inch. The length of the padlock when locked shall be 3 inches \pm 1/8 inch, and its width or thickness not more than 2-3/4 inches.

3.5 Padlock mechanism.

3.5.1 General. The design of the padlock mechanism of each type shall preclude the changing of the combination without knowledge of the existing combination settings. Placing the shackle in the locked position shall disperse or scramble the combination to an undeterminable position (see 3.14). The lock mechanism shall not permit the exposed shackle or concealed bolt to be locked out in the open position. It shall not be possible to determine the combination when the padlock is in the open position without knowledge of the existing combination. The exposed shackle shall not spring out to the open position when the padlock is unlocked, but shall be required to be pulled to the open position. The locking bolt of the dial type padlock shall be guarded by not less than three combination wheels and a driving wheel or cam.

3.5.2 Available combinations. The combination wheels for the dial type, and the pins or tumblers for the pushbutton type padlocks shall be capable of affording at least 30,000 different, independent secure combinations. The dialing tolerance for opening the dial type lock shall be not less than 1/4 dial division, or number, from either side of any true dial setting.

3.6 Dial face markings and push button mounting.

3.6.1 Dial markings. The dial face of the DC and DE type padlocks shall have not less than 50 depressed graduation marks. The marks and identifying numbers shall be made clearly visible and legible for running the combination setting.

3.6.2 Pushbutton mounting. The mounting of the pushbuttons in the PC and PE type padlocks shall be positioned in such a manner to provide for the ease of their operation in running the combination. The buttons shall be identified by consecutive numbers beginning with the figure 1 stamped on the locks in a position so as to be clearly visible and legible for running the combination setting.

3.7 Tamper resistance. Padlocks of the types specified shall afford resistance to opening by manipulation and surreptitious attack for not less than the periods of time indicated hereunder when tested in accordance with 4.4.1 and 4.4.2.

TYPE:

DC - 30 man-minutes opening by manipulation and 15 man-minutes opening by surreptitious attack.
DE - 30 man-minutes opening by manipulation and 10 man-minutes opening by surreptitious attack.
PC - 30 man-minutes opening by manipulation and 15 man-minutes opening by surreptitious attack.
PE - 30 man-minutes opening by manipulation and 10 man-minutes opening by surreptitious attack.

3.8 Resistance to radiographic techniques. The class 1 padlocks of each type shall provide resistance to radiographic techniques for not less than 30 minutes when tested in accordance with 4.4.3.

3.8.1 Radiographic protection. Radiographic protection for the class 1 padlock may be provided by the composition of the materials from which its components are constructed, or may be provided by the addition of a shielding cover.

3.9 Combination change device. A key or other suitable device for changing the combination shall be furnished with each padlock. The change device, if a key shall be combinable to the series of padlocks the producer shall furnish and shall be prominently and permanently marked with a designation of the manufacturer's padlock series. The change device shall be of corrosion resistant material or have a corrosion resistant finish.

FF-P-110E

3.10 Lubrication. All moving parts of the padlock mechanism shall operate smoothly and quietly. A lubricant normally employed by the manufacturer for padlocks may be used. The bearing surface of the mechanism shall not show gummy deposits or wear sufficient to interfere with its operation after 5,000 cycles of actual or simulated locking and unlocking and 50 actual or simulated changes of the combination.

3.11 Finish. All parts of the padlock, other than those of non-corrosive materials, shall be protected against corrosion by electro-plating or other effective methods. The shackle, if of steel, shall have an electro-plated nickel finish.

3.12 Marking and serialization.

3.12.1 Back. The padlock shall be legibly marked on the back with the letters "U. S."; the manufacturer's name or trademark; the model number; and the classification, as follows:

For class 1 padlocks:

CL 1

FF-P-110

Date : (year)

For class 2 padlocks:

CL 2

FF-P-110

Date: (year)

Padlock that are constructed of materials that permit a single product to conform to both class 1 and class 2 requirements shall be marked as follows:

CL 1/CL 2

FF-P-110

Date: (year)

3.12.1.1 Method of marking. Markings specified in 3.12.1 shall be either embossed to a height of approximately 0.018-inch or engraved to a depth of not less than 0.005.

3.12.2 Exposed shackle type. Each padlock of the exposed shackle types shall be identifiable by serialization of the lock shackle and the lock case cover as specified hereunder.

3.12.2.1 Shackle serialization. The series number identifying the shackle shall be randomly different from and have no association to the lock case cover series number. The number shall be stamped on so that it is concealed when the shackle is in the locked position. The series number shall be stamped on the shackle with a 3/32-inch die prior to the case hardening process.

3.12.2.2 Case cover serialization. The series number identifying the case cover shall be randomly different from and have no association to the lock shackle number. The number shall appear on one side of the case cover and shall be stamped on with a 3/32-inch die prior to the finish process.

3.12.2.3 Concealed shackle type. Each padlock of the concealed shackle type shall be identifiable by serialization of the lock case cover. The series number shall be stamped on the front or on one side of the cover with a 3/32-inch die prior to the finish process.

3.13 Workmanship. The finished padlock shall be of substantial construction designed to withstand severe usage. Working parts shall be accurately fitted. All parts shall be well finished, true to form, and free from any defect which may affect appearance, operation, or serviceability of the padlock.

3.14 Instructions. A copy of the manufacturer's instructions describing how to run the combination and how to change the combination shall be furnished with each padlock. The instructions furnished with dial type padlocks shall contain the following statement: "The padlock dial must be turned at least 5 complete revolutions in one direction to assure that the padlock is fully locked".

4. QUALITY ASSURANCE PROVISIONS

4.1 Inspection responsibility. Other than testing for qualification, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities or services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract or order. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.1 Component and material inspection. In accordance with 4.1, the supplier is responsible for insuring that components and materials used are manufactured, tested, and inspected in accordance with the requirements of referenced subsidiary specifications and standards to the extent specified, or, if none, in accordance with this specification.

4.1.2 Sampling for inspection. Except as otherwise specified herein, sampling for inspection shall be performed in accordance with MIL-STD-105.

4.1.3 Inspection of the end product. A lot shall consist of all padlocks of one type and one class submitted for inspection at one time. Unless otherwise specified herein, the sample unit for this inspection shall be one completely assembled padlock.

4.1.4 Visual examination. The completely assembled padlock shall be examined for defects classified in table I. The inspection level shall be S-3 with an acceptable quality level of 2.5 for total defects, expressed in terms of defects per hundred units.

TABLE I. Classification of defects

Examine	Defect
Material	Not as specified. Not well finished. Not free from burrs, splinters, or rough edges.
Construction	Not as specified. Part broken, split, fractured, or cracked. Any functioning component is unoperative or will not operate as intended. Combination setting can be changed without knowledge of existing combination. Does not disperse or scramble combination setting as specified. Shackle can be locked out in open position. Shackle springs to open position without being pulled open.
Dial settings (for dial types)	Dialing tolerance not as specified. Less than 30,000 different independent secure combinations.
Dial markings (for dial types)	Dial markings not as specified.
Pushbutton mounting (for pushbutton types)	Not as specified.
Combination change device	Not as specified; not marked as specified; not corrosion resistant.
Lubrication	Not as specified.
Markings	Not marked on back as specified. Marking incorrect. Not method specified. Incomplete Shackle and case not serialized as specified.
Workmanship	Poor workmanship. Has defect which may affect appearance, operation or serviceability.
Instructions for operation	Instructions for setting combination and operation missing. Incomplete instructions.

4.1.5 Testing for acceptance. Acceptance testing of products under contract or purchase order will be made by the Government from time to time to assure continued compliance with specification requirements. In this regard, samples from lots offered for acceptance will be taken by the Government inspector for testing as specified in 4.4.1 through 4.4.8. The testing shall be performed by a Government agency. Samples shall be furnished at no cost to the Government and shall be delivered to the testing facility transportation prepaid. Failure of any sample to meet testing requirements shall provide reason to suspend acceptance of the manufacturer's production until the Government inspector is satisfied that all defects in the product have been corrected.

4.2 Inspection of preparation for delivery. An inspection shall be made to determine that the packaging, packing and marking comply with the requirements in section 5 of this specification. Defects shall be scored in accordance with table II. For examination of interior packaging the sample unit shall be one shipping container fully prepared for delivery, selected at random just prior to the closing operations. Sampling shall be in accordance with MIL-STD-105. Defects of closure listed shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in end item inspection lot. The inspection level shall be S-2 with an AQL of 4.0 defects per hundred units.

TABLE II. Classification of preparation for delivery defects.

Examine	Defects
Markings (exterior and interior)	Omitted; incorrect; illegible; improper size, location, sequence, or method of application.
Materials	Any component missing or damaged.
Workmanship	Inadequate application of components such as incomplete closure of container flaps, loose strapping, inadequate stapling. Distortion of container.

4.3 Qualification. Products submitted for qualification shall be inspected in accordance with 4.1.4 and tested as specified in 4.4.1 through 4.4.8. Failure to meet any one or more of these requirements shall provide reason to consider the product as not meeting QPL requirements.

4.3.1 Testing agency. Qualification testing of the sample padlocks and any retesting that may be required for requalification shall be performed by a testing agency specifically designated by the General Services Administration.

4.3.2 Cost of tests. All testing costs incurred during the testing of the qualification sample and costs of retest of a qualified padlock if subsequently disqualified under 3.1.1.1 or 3.1.1.2, shall be borne by the manufacturer, and shall be made payable to the General Services Administration as directed by Standardization Division, Federal Supply Service.

4.3.3 Testing procedures. The following testing procedures shall apply to all padlocks submitted for qualification:

- a. Samples will be tested in sequence of their receipt at the testing facility.
- b. A qualification test may be discontinued at the testing facility at any time the product fails to meet any one or more of the requirements of this specification. The manufacturer may be permitted to make modifications on his product during the testing phase when such modifications, in the judgement of the General Services Administration and the testing facility, are clearly in the best interest of the Government.
- c. In case of failure of the sample submitted, consideration will be given to the request of the manufacturer for resubmission for retest only after it has been clearly shown that changes have been made in the padlock which the Government considers sufficient to warrant retest.
- d. The manufacturer or his representative will not be permitted to observe the actual test conducted on his product at the testing facility. However, when samples tested fail to comply with the requirements of this specification, the samples may be examined by the manufacturer or his representative and full details of the failure may be made known to them in a manner which, for reasons of security, will be in the best interest of the Government.

4.3.4 Qualification test sample. Seven qualification test samples of each type in the classes the supplier proposes to furnish, shall be forwarded at a time and to a place designated by the General Services Administration. In the event the test samples are destroyed or damaged to such an extent during testing that testing cannot be completed, the Government reserves the right to require the manufacturer to furnish additional samples to complete the test. Samples shall be plainly identified by securely attached durable tags, marked as follows:

Sample for Qualification Test

Padlock, changeable combination

(Class Type)

Fed. Spec. FF-P-110F

Date of manufacture (year)

The qualification samples shall be delivered to the Government testing facility transportation prepaid and shall be furnished at no cost to the Government. Tested samples will not be returned to the manufacturer.

4.3.5 Drawings and material specifications. The manufacturer shall submit four copies of complete detailed construction and assembly drawings and material specifications with each type and class padlock submitted for test. The drawings, when padlocks are accepted, will be approved by the General Services Administration for use in inspection and will be held in proprietary confidence. Any change in the approved drawings shall be made only after approval for the change is obtained in writing from the Standardization Division, Federal Supply Service, General Services Administration.

4.3.6 Qualification testing. Qualification testing shall consist of the inspections in 4.1.4 and the following tests described under "Test method" in 4.4. Failure of the sample padlock to withstand any one or more of these requirements shall provide reason to consider the product as having failed to qualify.

- (a) Manipulation technique test - 4.4.1
- (b) Surreptitious attack test - 4.4.2
- (c) Radiographic test (as applicable) - 4.4.3
- (d) Direct tension test 4.4.4
- (e) Jar test with tension 4.4.5
- (f) Jar test without tension 4.4.6
- (g) Padlock shackle test - 4.4.7
- (h) Drop test - 4.4.8

4.4 Test method. For the purpose of the tests in 4.4.1, 4.4.2, and 4.4.6, the padlock shackle shall be fastened to a hasp secured to the top-front of a 4- or 5-drawer, steel filing cabinet.

4.4.1 Manipulation technique test. There shall be no limit on the number of manipulation techniques attempted and each technique may be applied for the full net working time, using the human senses amplified as necessary by unlimited types of mechanical, electric, electronic, and magnetic equipment. The tools and equipment shall be capable of being carried in a case not exceeding 1.5 cubic feet in volume and 9 inches in thickness and which do not exceed a total weight of 25 pounds (exclusive of weight of case). The padlock shall resist opening by manipulation techniques for the period of time specified in 3.7.

4.4.2 Surreptitious attack test. There shall be no limit on the number of surreptitious attacks attempted and each attack may be applied for the full specified time. The best method or combination of methods may be applied for the full net working time. The net working time will include time expended for any masking or repair of damage to the lock that may become necessary to obliterate evidence of penetration. Any repairs necessary to obliterate or mask evidence of attack shall be made without substitution of parts. There shall be no limitations on the time required for exploration and preparation for the test. The tools and devices used in the test will be limited to those powered by hand. The tools shall be capable of being carried in a case not exceeding 1.5 cubic feet in volume and 9 inches in thickness and which do not exceed a total of 25 pounds (exclusive of weight of case). Heat such as that from a blow torch or an electric arc shall not be used. The padlock shall resist opening by surreptitious attack for the period of time specified in 3.7.

4.4.3 Radiographic test. The class 1 padlock shall be tested under the following conditions to determine resistance to opening by radiographic techniques. Portable x-ray equipment, not to include the use of isotopes, will be used. Weight of the equipment shall not exceed 75 pounds. Any radiation shielding provided for the padlock will be included in the test. The padlock shall be radiographed and resulting radiographs shall not permit opening of the padlock within the time specified in 3.8.

4.4.4 Direct tension test. The body of the padlock shall be held in a metal strap bearing against the outer surface of the case with a slot permitting the shackle to pass through and engage in a suitable hook or eye. A tension force of 500 pounds shall be applied slowly along the vertical centerline of the padlock so as to put a direct and equal tension in each shank of the lock shackle. The applied tension shall not damage the lock or its locking mechanism nor permit opening by manipulation within the time specified in 3.7.

4.4.5 Jar test with tension. With a coil spring compressed between the shackle and the lock case cover to produce a force of approximately 60 pounds, the padlock shall be tested as specified in 4.4.6. The applied force shall not release the shackle nor permit opening by manipulation within the time specified in 3.7.

4.4.6 Jar test without tension. The padlock shall be fastened to a filing cabinet as specified in 4.4. The lock case shall be held loosely with one hand and the padlock shall be struck with a substantial blow, the heel on the padlock being released immediately before the blow, so as to jar the padlock forcibly against the cabinet. This procedure shall be performed not less than six times by striking the padlock from different directions. A wood, plastic, or lead mallet weighing not more than 12 ounces shall be used to deliver the blows. Such jarring blows, shall not release the shackle nor permit opening by manipulation within the time specified in 3.7.

4.4.7 Padlock shackle test. The padlock shall be held firmly in a vise or other suitable device and sufficient tension force shall be applied between the lock shackle and the lock case until the shackle is broken or released from its case. The damage to the lock and shackle shall be to the extent specified in 3.3.

4.4.8 Drop test. At least two sample padlocks of each type shall be dropped six feet to a concrete floor at least ten times. The impacts shall not damage the lock or its locking mechanism nor permit opening by manipulation within the time specified in 3.7.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A, B, or C, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Unit packaging. Each padlock with instructions shall be wrapped with material conforming to US-P-553 and packaged in a close-fitting box conforming to PPP-B-505, style II, type A, class a, PPP-B-665 style B or PPP-B-676, type I.

5.1.1.2 Intermediate packaging. Twelve unit packages of padlocks of the description shall be intermediate packaged in a close-fitting box conforming to PPP-B-566, PPP-B-665, PPP-B-676, or PPP-B-636, class domestic. The fiberboard box shall be closed in accordance with the appendix to the box specification.

5.1.2 Level B. The padlocks shall be packaged as specified in 5.1.1.1 and 5.1.1.2.

5.1.3 Level C. The padlocks shall be packaged to afford adequate protection against damage during shipment from the supplier to the initial destination.

5.2 Packing. Packing shall be level A, B or C, as specified (see 6.2).

5.2.1 Level A. The padlocks in quantities as specified (see 6.2) shall be packed in a close-fitting box conforming to PPP-B-585, class 3; PPP-B-591, class II; PPP-B-601, overseas type; PPP-B-621, class 2; PPP-B-636, class weather-resistant or PPP-B-640, class 1, grade A. The wood boxes shall be provided with a case liner conforming to MIL-L-11747 and sealed in accordance with the appendix thereto. The boxes shall be closed and strapped in accordance with the specification or appendix thereto. The gross weight of the triple-wall fiberboard box and the wood boxes shall not exceed 200 pounds. The gross weight of the PPP-B-636 box shall not exceed the weight limitations of the box specification.

5.2.2 Level B. Six intermediate packages of padlocks of like description shall be packed in a close-fitting box conforming to PPP-B-636, class domestic. The box shall be closed in accordance with the appendix to the box specification.

5.2.3 Level C. The padlocks packaged as specified in paragraph 5.1.3 shall be packed in containers that will assure carrier acceptance and safe arrival at destination in compliance with the Uniform Freight Classification or the National Motor Freight Classification.

5.3 Marking.

5.3.1 Civil agencies. In addition to markings required by the contract or order, the interior packaging and shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.3.2 Military agencies. In addition to markings required by the contract or order, the interior packaging and shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. The padlocks furnished under this specification are intended for use as determined by the using activity.

6.2 Ordering data. Purchasers should exercise any desired options offered herein, and procurement documents should specify the following:

- (a) Title, symbol, and date of this specification.
- (b) Class and type padlock desired (see 1.2.1 and 1.2.2).
- (c) Whether padlocks for shipboard use require shackles of brass or bronze (see 3.2.1).
- (d) Selection of applicable level of packaging and packing required (see 5.1 and 5.2).
- (e) Quantity of intermediate packages required in the shipping container (see 5.2.1).

6.3 Qualification. With respect to products requiring qualification awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved for inclusion on the applicable Federal Qualified Products List, whether or not such products have actually been so listed by that date. The attention of suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification so that they may eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is Standardization Division, Federal Supply Service, General Services Administration, Washington, D. C. 20406, and information pertaining to qualification may be obtained from that activity.

6.4 Definition of terms used in this specification:

6.4.1 Manipulation. For the purposes of this specification, the term "manipulation" means the opening of the padlock without alteration of the physical structure or disarranging or substitution of any parts of the padlock. Ordinarily manipulation would be accomplished by movement of the dial.

6.4.2 Surreptitious attack. For the purpose of this specification, the term "opening by surreptitious attack" is defined as the opening and closing of the padlock in such a manner or by such a means as to leave no evidence of the act which would be readily discernible in normal use of the padlock. Ordinarily surreptitious opening would be accomplished by drilling, or other physical or mechanical penetration or the forcing or prying out of component parts, and then restoring the lock to its apparent original condition by repairs. Repairs shall be accomplished without substitution of parts.

6.4.3 Man-minutes. Time expended times the number of men engaged in the test.

6.4.4 Radiographic attack test. For the purpose of this specification the test specified in ... is intended to simulate attempted radiographic attack on the padlock within the specification limits of time and equipment, utilizing practicable and feasible procedures and equipment available to Government testing agencies performing the test.

6.4.5 Normal use. For the purpose of this specification the term "normal use" is defined as initiating the combination and opening the padlock; withdrawing the shackle from the staple, ring, chain links, or other device; and relocking the padlock, with all exterior surfaces of the padlock exposed to both view and touch.

MILITARY CUSTODIANS:

User Activities:

Army - E

Army - GL
Navy - YD
Air Force - 82

Review Activities:

Army - GL
Navy - YD, MC
Air Force - 82, 85

*U. S. GOVERNMENT PRINTING OFFICE : 1971 O - 436-360 (2209)

Orders for this publication are to be placed with the General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain copies and other documents referenced herein. Price 15 cents each.

**GENERAL SERVICES ADMINISTRATION - FEDERAL SUPPLY SERVICE
SPECIFICATION COMMENT SHEET**

BUDGET BUREAU NO.
29-R0175

INSTRUCTIONS

This form provides a way for users of this specification to inform the originator of problems encountered in its use. It is not to be used to request changes to accommodate proprietary features. All comments will be considered and appreciated, but please do not expect a reply. To comment: detach, complete, and mail: GSA-FSS, Standardization Division (FMCO) Washington, D. C. 20402.

NOTE: Comments on this form do not constitute or imply authorization to waive any part of the document or serve to amend contractual requirements.

1. SPECIFICATION FF-P-110F PADLOCK, CHANGEABLE COMBINATION (RESISTANT TO OPENING BY MANIPULATION AND SURREPTITIOUS ATTACK)

2. CONTRACT NO. (If any)	3. QUANTITY ON CONTRACT (Optional)	4. DOLLAR VALUE (Optional)
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5. GENERAL NATURE OF PROBLEM (e.g., inspection difficulties, manufacturers unable to meet tolerances, containers collapse under normal warehousing conditions, etc.)

6. SPECIFIC REQUIREMENTS AFFECTED (Include paragraph number and lines of wording)

7. SPECIFIC PROBLEMS (e.g. tests in 4.2.2 will not assure that the battery will last required time; temperature ranges in table 2 do not conform to commercially available items.)

8. RECOMMENDATIONS

9. NAME OF MANUFACTURER, ASSOCIATION, GOVT., AGENCY, ETC.

10. ADDRESS (Number, Street, City, State and Zip Code)

11. NAME AND TITLE OF SUBMITTER

12. DATE

GSA DC 89-0701

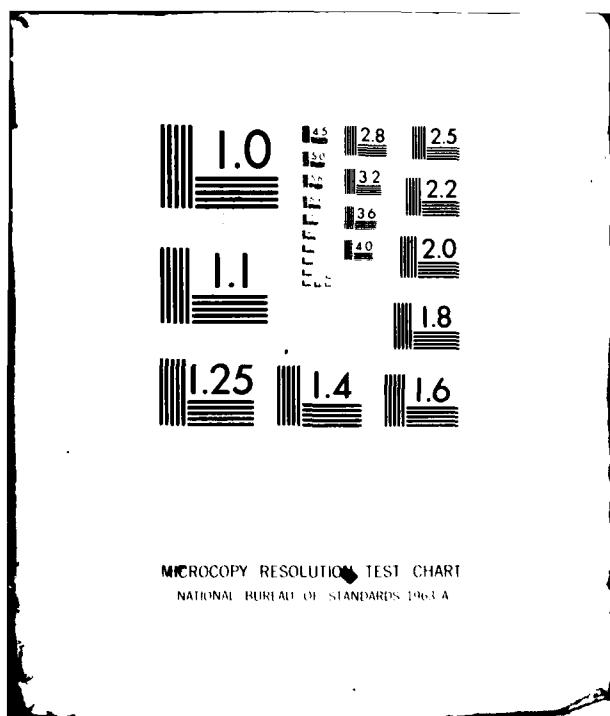
FORM
GSA FEB 69 2200

AD-A086 036 CENTER FOR NAVAL ANALYSES ALEXANDRIA VA INST OF NAVAL--ETC F/6 15/5
AN ANALYSIS OF COMMERCIAL COMMODITY ACQUISITION.(U)
DEC 79 B N ANGIER, T B WHITE, S A HOROWITZ N00014-79-C-0104
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UNCLASSIFIED CRC-418

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FF-P-11OF
INT. AMENDMENT-2
July 28, 1972
SUPERSEDING
INT. AMENDMENT-1
June 15, 1972

INTERIM AMENDMENT
TO
FEDERAL SPECIFICATION

PADLOCK, CHANGEABLE COMBINATION
(RESISTANT TO OPENING BY MANIPULATION
AND SURREPTITIOUS ATTACK)

This interim amendment was developed by General Services Administration, Federal Supply Service, Standardization Division, Washington, D. C. 20406, based upon currently available technical information. It is recommended that Federal agencies use it in procurement and forward any recommendations for changes to the preparing activity at the address shown above.

The General Services Administration has authorized the use of this interim amendment as a valid exception to Federal Specification FF-P-11OF, dated December 18, 1970.

PAGE 1

Paragraph 1.1 - Delete text in its entirety and substitute "This specification covers changeable combination padlocks designed to conform to the standards for security equipment as set forth in the 'National Security Council Directive Governing The Classification, Downgrading, Declassification and Safeguarding Of National Security Information.' The padlocks are required to resist opening by manipulation and surreptitious techniques for the periods of time specified in 3.7. The padlocks are intended for use as specified in 6.1. The padlocks are not tested for forced opening."

PAGE 2

Paragraph 3.2.1 - Delete 1st sentence and substitute "The padlock case, cover, and internal parts subject to wear, with the exception of the locking bolt and combination wheels, shall be of steel, brass, bronze, zinc alloy, or other suitable material provided the finished product withstands the tests in 4.3.6. Combination wheels may be of any suitable material provided the finished product withstands the tests in 4.3.6 which are applicable to its class."

AD IN COMMERCE BUSINESS DAILY

COMMERCE BUSINESS DAILY

Issue No. PSA-7392; August 14, 1979

COMMERCIAL COMMODITY ACQUISITION

ANALYSIS OF COMMERCIAL COMMODITY ACQUISITION The Center for Naval Analyses is working on a contract (N00014-79-C-0104) for the Defense Advanced Research Projects Agency which involves identifying items that are commercially produced and sold, and which may be close substitutes for items produced to military specifications. The focus of this study is on the material procured for use by a Marine 105 mm howitzer battery. This includes the material in the Table of Equipment (T/E) assigned to the battery; T/E material assigned to the battalion, but issued to the battery (the "782" equipment); and the 250 largest dollar items on the list of consumable items used by the battery. We are interested in prices, quantity discounts, and delivery cost data for such substitutes. If you would be willing to supply this info., contact Bruce Angier at 703/998-3715 or Center for Naval Analyses, 2000 N Beauregard St., Alexandria, Virginia 22311. This request is for info and planning purposes only. The Gov does not intend to award a contract on the basis of this request for quotation, or otherwise pay for the info solicited.

IDENTIFICATION SHEET -- COMMERCIAL PRODUCT SUBSTITUTE

Date: _____

GOVERNMENT SUPPLIED ITEM National Stock Number: _____

Nomenclature: _____

SUBSTITUTE ITEM Corporate Identification Number: _____

Nomenclature: _____

COMPANY NAME AND ADDRESS: _____
_____Per Unit Costs of Various Sized Orders (or base price and formula for quantity discount)

<u>Quantity</u>	<u>Selling Price</u>	<u>Excise Tax</u>	<u>Package & Delivery</u>	<u>Other</u>	<u>Total</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Will the substitute item meet government specifications? (If answer is no, please explain the features that do not meet the known specifications.)

<u>Our locations</u>	<u>Your nearest supply center</u>	<u>Estimated delivery time</u>
Jacksonville, NC	_____	_____
San Diego, CA	_____	_____

Any other information considered pertinent such as normal life of item (in years,), mean time between failure, etc.

Please send responses to:
CENTER FOR NAVAL ANALYSES
2000 North Beauregard Street
Alexandria, Virginia 22311
ATTN: B. ANGIER (INS)

IDENTIFICATION SHEET -- COMMERCIAL PRODUCT SUBSTITUTE

Date: June 29, 1979

GOVERNMENT SUPPLIED ITEM National Stock Number: 6646-00-9523767
MIL-W-46374B (MU)

Nomenclature: Watch, Wrist: General Purpose

SUBSTITUTE ITEM Corporate Identification Number: 38224Nomenclature: Judge 17-jewel Calendar Wrist Watch, 24-hour military style dial, stainless steel band.COMPANY NAME AND ADDRESS: Westclox U.S., P. O. Box 1059, Norcross, GA 30091Per Unit Costs of Various Sized Orders (or base price and formula for quantity discount)

Quantity	Selling Price	Excise Tax	Package & Delivery Actual ship.cgs.	Other	Total
1	\$25.90	---		---	\$25.90 + Ship.
20	\$25.90	---	Prepaid	---	\$25.90
100	\$23.31	---	Prepaid	---	\$23.31

Will the substitute item meet government specifications? (If answer is no, please explain the features that do not meet the known specifications.)

No. Case is chrome-plated brass. No. 38224 has date calendar features not required by specifications. No. 38224 has stainless steel band instead of nylon strap. No. 38224 is water resistant under FTC guidelines to three atmospheres. Waterproof designation not legal on commercial product. Partial product would not be marked in accordance with Fig. 4. Glossy print enclosed.

<u>Our locations</u>	<u>Your nearest supply center</u>	<u>Estimated delivery time</u>
Jacksonville, NC	Athens, Georgia	Two (2) Weeks
San Diego, CA	Athens, Georgia	Three (3) Weeks

Any other information considered pertinent such as normal life of item (in years,), mean time between failure, etc.

#38224 uses high quality 17-jewel, jeweled lever movement. Movement is France Ebauche 140-1 assembled in U.S. Virgin Islands, cased and packaged in Franklin Springs, Georgia.

Please send responses to:
CENTER FOR NAVAL ANALYSES
 2000 North Beauregard Street
 Alexandria, Virginia 22311
 ATTN: B. ANGIER (INS)

APPENDIX F

COMPLETE LIST OF ITEMS ASSIGNED TO THE BATTERY,
GENERAL SUPPLY LIST, AND POSITIVE RESPONSE LIST

Table F-1	Items Assigned to or Purchased by a 105-mm. Howitzer Battery	F-1
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Table F-3	Items for Which a Positive Response Was Received	F-13
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TABLE F-1

ITEM NUMBER	STOCK NUMBER	ITEM NAME	UNIT PRICE	QUANTITY	WARRANTY REPLACEMENT RATE		ITEM NUMBER	STOCK NUMBER	ITEM NAME	UNIT PRICE	QUANTITY	WARRANTY REPLACEMENT RATE	
					ISSUED OR USED	PLANNED LIFE						ISSUED OR USED	PLANNED LIFE
1005621	1112129	Pistol, P-101, 9mm, TYPE USE SIC IN MILITARY, 1 SURV SURV, TYPE MILITARY	1.50	1	6	2	0.240	0.120	0.120	0.120	0.120	0.120	0.120
1005621	1112129	Ulfaham Gun	1.75	1	11.4	1	0.360	0.024	0.024	0.024	0.024	0.024	0.024
1005621	1112129	GUN, HAND GUN	1.75	1	10.3	1	0.360	0.024	0.024	0.024	0.024	0.024	0.024
1005621	1112129	HARNESS-KIT, M/S CATEARD, F/WIFLE W-16, P/P	2.25	1	20.0	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	FIRING ATTACHMENT W	1.10	1	4.0	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	FIRING ATTACHMENT BG	5.31	1	4.0	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CIVER MACHIN QUB	30.27	1	2.0	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	SURV GUN MIL SURV	0.75	1	16.3	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	Pistol, CHARTER	2.40	1	10	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CHARTER PISTOL, 9MM	212.76	1	1	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	PISTOL, TIPDOP, 9MM	215.05	4	15	1	0.360	0.024	0.024	0.024	0.024	0.024	0.024
1005621	1112129	PISTOL, GLOCK, 9MM, FLEXIFL	215.05	4	15	1	0.360	0.024	0.024	0.024	0.024	0.024	0.024
1005621	1112129	PISTOL, ALUM, GLOCK 45, HOLSTER MIL, N/FMSI 11	266.00	27	15	1	0.180	0.012	0.012	0.012	0.012	0.012	0.012
1005621	1112129	BAKEL GUN	393.00	0	0	0	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	BAKEL, TIPDOP, 9MM	455.62	4	20	1	0.360	0.024	0.024	0.024	0.024	0.024	0.024
1005621	1112129	PISTOL, GLOCK, 9MM	2627.00	4	15	1	0.360	0.024	0.024	0.024	0.024	0.024	0.024
1005621	1112129	MOLYBOL, 9MM, B/MOLSTER	40.00	0	0	0	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	MOLYBOL, 9MM, B/MOLSTER	2.59	2	52.5	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	MOLYBOL, 9MM, B/MOLSTER	267.30	99	15	1	2.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	MOLYBOL, 9MM, B/MOLSTER	214.00	10	15	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	MOLYBOL, 9MM, B/MOLSTER	99.51	0	0	0	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	MOLYBOL, 9MM, B/MOLSTER	21254.00	0	0	0	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH	155.00	0	0	0	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH ASSEMBLY	49.57	2	25.12	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH ASSEMBLY, SPEC	52.03	1	1.2	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	25.76	2	1	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	198.00	1	1.4	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	108.50	1	1.4	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	16.64	2	2.6	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	212.00	0	0	0	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	187.00	0	0	0	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	21.19	0	0	0	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	32.96	0	0	0	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	15.20	4	52.32	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	116.00	25	1	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	212.03	2	1	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	6.00	6	94.9	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	12.01	2	2.4	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	56.69	0	0	0	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	5.67	27	10	1	1.000	0.100	0.100	0.100	0.100	0.100	0.100
1005621	1112129	CLICH, 9MM, B/M	6.15	5	5.5	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	76.71	2	10	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	11.31	2	2.4	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	20.60	1	1.1	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	115.10	7	15	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	170.00	15	15	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	115.00	0	0	0	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	44.49	1	1.0	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	375.00	1	1.2	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	115.10	7	15	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	55.44	0	0	0	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	32.45	1	1.0	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	115.10	7	15	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	115.10	7	15	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	62.30	1	1.0	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	81.13	1	1.0	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	43.61	1	1.0	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036
1005621	1112129	CLICH, 9MM, B/M	110.00	1	1.0	1	0.480	0.036	0.036	0.036	0.036	0.036	0.036

TABLE F-1 (Continued)

TABLE F-1 (Continued)

TABLE F-1 (Continued)

ITEM CONTROL NUMBER	PARTIAL STOCK NUMBER	ITEM NAME	QUANTITY ISSUED ON USED	PLANNED LIFE	WARTIME REPLACEMENT RATE	PEACE TIME REPLACEMENT RATE
0030624	4510-C-00-5307448	FRTV CRT-FACIAL CLSTRACTION AND RPM	107.48	1	7	7
0070624	4910-C-00-5277669	TDM1 RLT-THKING 20 FCH SPN SFT B/F/147	46.25	1	1	1
0290624	4510-C-00-5307539	FCTL WAT-TURBINE FRTVNCIA FOR POS 2131	145.00	1	15	15
JG70624	4510-C-00-5307572	FCM WAT-TURBINE 20 FCH SPN BASIC SET 8 21	75.40	1	15	15
0075624	4910-C-00-5307590	FOTL WAT-TURBINE 20 FCH SPN SFT P 0501/992	205.60	1	7	7
J075624	4510-C-00-5307702	FOTL WAT-TURBINE-AT-1.5 HORSES	1410.62	1	15	15
K4130624	4730-C-00-5244661	PLMP QCCP1	1	1	1	1
K4270624	4730-C-00-5244694	ULTRASONIC, POWER-MAGNET CIRCUIT	151.43	2	10	10
K4270624	4730-C-00-5247293	LISPERPEN PLP, HPC NATURAL	26.51	1	10	10
G910624	4910-C-00-5302686	CALF PLUG OIL	20.35	1.2	1.2	1.2
E290624	4510-C-00-5307700	WHL-BSPLL AVPS REPAIRMAN	16.00	1	15	15
F010624	4910-C-00-5307704	CM35-Q1T PLP,COMPONENTS	1	1	1	1
J110624	4510-C-00-5306520	WEAPZ MUZZLE LCP3	1.00	1	1	1
J110624	4510-C-00-5306540	INKEA MURKOPPLA Q1-NATED CAP.	161.49	1	5	5
B010624	4940-C-00-4476689	DRG-SHPT-PLP, HPC NATURAL	29.00	1	10	10
A540624	4540-C-00-4482211	GRILL ASSORTIV CLEA	252.66	0.2	10	10
H4520624	5110-C-00-5311796	MARSHALL MAGNIF	2.45	1.0	1.0	1.0
H4520624	5120-C-00-5301550	WT-1000 SP-SIGHT	92.57	0.4	10	10
H4520624	5120-C-00-5301567	WT-1000-QD-JNPLC	11.04	3.2	3.2	3.2
H4520624	5120-C-00-5301573	INKEA MURKOPPLA,PLP	16.04	1.9	1.9	1.9
H4520624	5120-C-00-5301576	PARTITION,ASSEMBL	2.15	1.4	1.4	1.4
C3230624	5120-C-00-5301580	TAUTRACHING TELL COOPERATION (INCLUDE)	3.50	1.2	1.2	1.2
H4520624	5120-C-00-5301596	VLS-FANCH AN PIPE	166.60	0.2	10	10
H4520624	5120-C-00-5301602	PULLIN KIT MICHAEL	211.00	0.4	10	10
H4520624	5120-C-00-5301627	REFINN SET BACKET	54.00	0.6	10	10
H4520624	5120-C-00-5301630	PULLIN WITH-ANTICAL	40.78	0.7	15	15
H4520624	5120-C-00-5301636	WT-HM-NM-ANL REAGNG AGC NUT	6.50	1	1	1
H4520624	5120-C-00-5301637	UNTRACHING 1000 WHE	7.50	1	1	1
H4520624	5120-C-00-5301644	WT-KHM SET CERULATION	91.15	0.6	10	10
H4520624	5120-C-00-5301646	WPINN IMPACT,SPHERATIC,STRAIGHT,DRIVE,3/4"	271.00	0.1	10	10
H4520624	5120-C-00-5301647	ORILL LIFCTMIC PLP	127.00	0.5	10	10
H4520624	5120-C-00-5301648	SPINDLE,ELASTIC	127.00	0.7	10	10
H4520624	5120-C-00-5301649	CRILL TURCIC POR 1	61.00	0.8	10	10
H4520624	5120-C-00-5301650	TOLL PLX REPAIRHLF	36.00	1.0	10	10
H4520624	5120-C-00-5301651	CFRT TOLI	58.25	1.2	1.2	1.2
H4520624	5120-C-00-5301652	ICUL WT THICK	159.00	0.2	10	10
H4520624	5120-C-00-5301653	IMU PI 10-33	12.00	1	5	5
H4520624	5120-C-00-5301654	IMU WT CRATE, BUREA	172.26	1	20	20
H4520624	5120-C-00-5301655	IMU, BUREA,WT	21.76	1	15	15
H4520624	5120-C-00-5301656	IMU WT MICHAEL	181.00	1	20	20
H4520624	5120-C-00-5301657	IMU WT REPAIRABLE SUPPLIRS SET-CAVAS	269.00	1	3	3
H4520624	5120-C-00-5301658	RCNL WT-AFTL,WHITE,10G 6155-#POS 2131	74.26	1	15	15
H4520624	5120-C-00-5301659	RCNL WT-AFTL,WHITE,10G 6155-#POS 2131	55.85	1	10	10
H4520624	5120-C-00-5301660	RCNL WT-AFTL,WHITE,10G 6155-#POS 2131	74.00	0.2	10	10
H4520624	5120-C-00-5301661	RCNL WT-AFTL,WHITE,10G 6155-#POS 2131	140.00	1	10	10
H4520624	5120-C-00-5301662	TOLL WT MFLCS	1.21	1	10	10
H4520624	5120-C-00-5301663	GOLD+Gaff	4.10	20.0	1	1
H4520624	5120-C-00-5301664	SCHL CAP-FRAGUN	0.60	5	1	1
H4520624	5120-C-00-5301665	STAPL'S	16.15	0.4	1	1
H4520624	5120-C-00-5301666	RETAINER PACKING	12.50	2.4	2.4	2.4
H4520624	5120-C-00-5301667	TRUNNOMETER	1.50	2	2	2
H4520624	5120-C-00-5301668	PAULDRX COP-NTSATION,WTGN SECURITY	11.50	1	1	1
H4520624	5120-C-00-5301669	TELEPHONE,SET	66.00	2.4	2.4	2.4
H4520624	5120-C-00-5301670	SWITCHBOARD TELEPHONE,MANUAL 59-22/PF	622.00	3.6	3	3
J3010624	5120-C-00-5301671	LAI-1000 JRC-FRAGUNATEC	51.00	1	1	1
H2350624	5120-C-00-5301672	HALLAND CAPLIP	6.00	1.6	1.6	1.6
H2460624	5120-C-00-5301673	PELLE EQUIP,PLC-11	31.29	1	10	10
H2460624	5120-C-00-5301674	TELEPHONE,SET 10-1/VPI	167.00	5	10	10
H2460624	5120-C-00-5301675	TELEPHONE ACT 7-1255/CT	150.81	10	10	10

TABLE F-1 (Continued)

TAN CONTROL NUMBER	MANUFACTURER STOCK NUMBER	ITEM NAME	QUANTITY ISSUED ON USED	PLANNED LIFE	MARITIME REPLACEMENT RATE	PENTIMENT REPLACEMENT RATE
H244126 A175616 A181976	1485-C-00-440100 1420-C-00-049-1999 181-C-00-2217473 SPC-00-19851 1470-00-319-6671 A41-C-00-4976754	TELEPHONE SET TAC-117/P1 PAULI SET CINNAMON GROUP UNIV CHA-398 MAVIC SET BAVIC-100 INSTALATION KIT FL INSTALATION KIT FL ANTANA-AU292	50.23 1144.00 1325.00 117.61 355.79 313.00	2.0 6 2 0.2 0.4 1.0	0.168 0.63 .90 -0.2 -0.4 0.240	0.024 -0.06 0.066 -0.01 -0.01 0.060
H265228	522-C-00-4976568	ANTANA LRD FA	157.59	1.7		
A152070 A225976 H236316	1424-C-00-9124513 1422-C-00-5313724 1474-C-00-548613 1470-00-4275215 147-C-00-4275215 147-C-00-7369133	PAULI SET PAVER-77 PUBLIC ADDRESS SYSTEM ANPI-5 LAOF PUBLIC ADDRESS PHOTOCOUPLE SET RIGHT SIDE GIGGLES INDIVIDUAL RIGHT VISION SIGN, ETC, SWFEN WEAPON RIGHT VISION SIGN INDIVIDUAL SWFEN WEAPON PHOTOCOUPLE ASSISTANT PAGE, INFRA-RED RIGHT SIDE ASSISTANT PAGE	276.25 6212.00 781.00 115.00 115.05 115.94	0.2 2 14 10 0.2 0.2	0 0 -0.3 -0.3 -0.3 -0.3	0.060 0.066 -0.01 -0.01 -0.01 -0.01
E115111 E115212 E115313 E103176	1494-C-00-191920 1493-C-00-191920 1493-C-00-191920 1495-C-00-191920	NIGHT VISION NIGHT VISION SIGN, ETC, SWFEN WEAPON NIGHT VISION SIGN INDIVIDUAL SWFEN WEAPON NIGHT VISION SIGN INDIVIDUAL SWFEN WEAPON	6417.00 2144.00 5461.00 2975.00	8 2 1 2	5 15 15 15	-0.2 -0.24 -0.24 -0.17
H211224 H211228	1494-C-00-221777 1495-C-00-221777	CLIP ELECTRICAL FLASHON INFRAS	211.00 26.30	0.4 2.9	6 10	0.0 -0.0
H2119024	1494-C-00-559150	UNITELEPHONE OPERATING	44.79	3	10	-0.0
H2119024	1494-C-00-113331	SERIALIZED CALLIC PANES	6.76	5.6	15	-0.0
H2119024	1494-C-00-692484	HEADSET, MICROPHONE	255.44	1.1	10	-0.0
H2119024	1495-C-00-1133496	REFINED ASSEMBLY	63.07	6	10	-0.0
H2119024	1495-C-00-1133491	REFINED 25-100% CERT	2.66	1.6	10	-0.0
H2119024	1495-C-00-1133491	REFINED ELECTRICAL	91.91	0.3	10	-0.0
H2119024	1495-C-00-1133491	REFINED GLASS	51.26	0.4	10	-0.0
H2119024	1495-C-00-4616171	PROTECH, PH-2	0.23	17	10	-0.0
H2119024	1495-C-00-7272115	WIRE SPIN, ICING KIT 4-156-G	2.59	10	10	-0.0
H2119024	1495-C-00-7272115	LAIR MAST	72.00	1	10	-0.0
H2119024	1495-C-00-7272115	PROTECH	11.18	0.2	10	-0.0
H2119024	1495-C-00-7272115	LAIR ANTARA SUPPORT	77.00	0.4	10	-0.0
H2119024	1495-C-00-7272115	ANTARA	43.77	2.4	10	-0.0
H2119024	1495-C-00-7272115	ANTARA	31.77	4.9	10	-0.0
H2119024	1495-C-00-7272115	TRIPOD ANTARA	1700.00	1.0	10	-0.0
H2119024	1495-C-00-7272115	ANTARA	107.38	0.4	10	-0.0
H2119024	1495-C-00-7272115	NO REFL	156.00	0.2	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY SPC	11.00	3.2	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY SPC	95.00	0.7	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	51.00	0.4	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	22.66	2.7	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	20.00	1.0	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	21.54	0.6	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	29.38	0.4	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	41.67	0.4	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	22.00	1.4	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	117.00	0.6	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	6.36	1.6	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	150.71	1.7	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	92.4	2.5	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	23.73	1.0	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	6.86	20.4	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	31.0	5	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	61.98	1.2	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	31.70	4.9	10	-0.0
H2119024	1495-C-00-7272115	CAULE ASSEMBLY PINE	62.71	3.4	10	-0.0

TABLE F-1 (Continued)

TAN COUNTRY NUMBER	NATIONAL STK# NUMBER	ITEM NAME	WARTIME REPLACEMENT RATE		QUANTITY ISSUED OR USED	UNIT PRICE	PLANNED LIFE	REPLACEMENT RATE
			ITEM NUMBER	DESCRIPTION				
9308021	ELAC-11-176665	LATTEN DOK	37-22	0.0	1	6.61	1	1.07
	1140-G-00-9146920	KIT, MEDICAL, SURGICAL				45.00	1-9	1.02
	1145-C-00-1670795	CAUL, TFL, W/ HLDW				10.71	10	1.02
M210521	1145-C-00-2656112	CAULET, IRL, W/ HLDW				11.37	10	1.02
M210516	1145-C-00-2551465	CHLT, IRL, W/ HLDW				5.16	20.0	1.02
	1145-C-00-2656113	WIRE, KIT, CHLT, HLDW				0.15	4	0.0
	1145-C-00-0016672	CALM, PLATE, PLASTIC				0.27	4	0.0
	1226-00-3146920	CATION DEFECTANT				95.21	0.4	3
	1236-C-00-1670611	LIGHT SURGICAL				8.26	1	3
	1239-00-4669404	ORTHALIC, FORTIFLIC, EN				6.66	4	3
	1250-00-1662904	OXINOL, ILLUMINATING				1.50	35	3
	1266-C-00-1698136	PALM, SET, GAS, INE				146.69	4	20
	1295-00-7177145	SILVERWOOD, OPHTHALMIC, CAMPING STRAP				95.75	1	10
	1302-00-1116163	LIPSTICK, ANTISCHAF, CLIMATE				16.37	1	3
	1345-00-0016645	LIQUID, KIT, MILITARY				6.44	126	5
	1345-00-1662904	LIQUID, KIT, MILITARY				10.49	21	3
	1345-00-0016647	FIRST AID KIT, MILITARY, GENERAL PURPOSE				11.57	15	10
	1325-00-001661604	COMBOS, DIGITALIC, UNPLUGGED				116.01	0.2	24
	1325-00-001661604	UNPLUGGED, ELECTRONIC				1020.00	0.2	
	1325-00-001661604	UNPLUGGED, ELECTRONIC				203.00	0.2	
	1325-00-001661604	WATCH, STOP				1650.00	0.2	
	1325-00-001661604	TEST KIT, MRC-902/MRC-12				1785.00	1	
	1325-00-001661604	TEST KIT, MRC-903/MRC-25				25.39	1	
	1325-00-001661604	TESTER, ANALYZE/EZ				0.25	2	
	1364-00-001661604	PAPER, LENS, ST-1515, 0CD, 90 EACH				42.69	2	
	1364-00-001661604	WATCH, STOP				23.67	18	
	1365-00-001661604	WATCH, BRIGHT, COMPATIF				406.00	4	
	1365-00-001661604	WEFFECTING, SYSTEMATIC, INTRUSION				1.12	25	
	1365-00-001661604	WADIC, INDICATE, INDICATOR				377.00	1	
	1365-00-001661604	WADING, WATER INDICATOR				10.14	10	
	1365-00-001661604	WADING, SET				211.04	2	
	1365-00-001661604	WADING, SYSTEMATIC, CHAFER				31.08	10	
	1365-00-001661604	WADING, SYSTEM				43.00	2	
	1365-00-001661604	WEFFECTOR, MILIT., CHEMICAL AGENT				40.00	7	
	1365-00-001661604	SCALE, PERSON, BENCH				87.63	0.4	
	1365-00-001661604	PIPING, SURVEYING				20.35	2.2	
	1365-00-001661604	SCALC, PLASTIC, CONCRETE				0.36	1	
	1365-00-001661604	PLANE, LATER, SURVEYING				261.65	0.4	
	1365-00-001661604	PLATING, EQUIPMENT, FIRE, DIR, MACHET				163.94	10	
	1365-00-001661604	INFECTIOUS, SURVIVING				165.00	0.4	
	1365-00-001661604	INFECTIVE, INFLUENZA, INFECTIVE, NSE				40.16	2	
	1365-00-001661604	PICNIC, ICHE, CHAPERONE, D, JUNGLE, LFAS				355.41	10	
	1365-00-001661604	PICTURE, CHAP, CHAPERONE, D, JUNGLE, LFAS				1.97	1	
	1365-00-001661604	LIN, CLEANING, SCRUB				2.27	1	
	1365-00-001661604	INFECTING, COMMUNICATING, BACTERIAL, SGL, DRUG				21.58	2	
	1365-00-001661604	INFECTING, AGIT, 1.3 OZ, CAN				5.83	10	
	1365-00-001661604	INFECT, HAIR, PURIFICATION				1.60	135	1
	1365-00-001661604	FIELD, ARTILLERY, TRAILER, 14.5MM				110.00	15	15
	1365-00-001661604	FAINT, SECUND, LACES, 100,000				1.35	4	
	1365-00-001661604	CHROMATIC, ALUMINUM, AND NYLON				19.05	126	
	1365-00-001661604	CHOC, STYLIC, COMPANY, RECORD				105.00	1	
	1365-00-001661604	CO, INFECTING, ADDICTS, PLATE				14.55	10	
	1365-00-001661604	SECURITY, FIRE, ETC, ETC				30.00	1	
	1365-00-001661604	CABINET, STYLIC, OFF				172.97	0.2	
	1365-00-001661604	FOAM, DISH, CUTTER, MEDICAL & VETS, USE				6.00	20	
	1365-00-001661604	DISINFECTANT, ANTIMICROBIAL, REAGENTS, FOR TYP, 00				125.50	126	
	1365-00-001661604	INFECTING, COR, INSECT, HAR, SF, OF FCU				0.62	126	
	1365-00-001661604	HAR, AFM, GREEP				15.10	252	15
	1365-00-001661604	CONTAIN, FIRE, ETC, ETC				10.27	70	
	1365-00-001661604	PAL, METAL, 1/4 GAL, CAP,				4.65	0	2
	1365-00-001661604	SCUG, CAN, SILIC, PLASTIC, 16 IN LONG, M/FILTER				3.00	6	5
	1365-00-001661604	LAUG, GAS, CHLOR, MILITARY, CAP				6.73	66	
	1365-00-001661604	LAUG, GAS, CHLOR, MILITARY, CAP				6.73	66	

TABLE F-1 (Continued)

TABLE F-1 (Continued)

TABLE F-2

TAM CONTIN- UAL NUMBER	NATIONAL STOCK NUMBER	ITEM NAME	UNIT	QUANTITY ISSUED ON USE		PLANNED LIFE	WARRANTY REPLACEMENT RAIL	
				ISSUED	REPLACEMENT			
PA0020	6000-00-000000	PAULUCK-WIDENHAGA STUFF USA STC INSTRUMENTS	PK	1.50	544.50	6	0.120	
CE6621	1000-00-000000	PAULUCK-WIDENHAGA STUFF USA STC INSTRUMENTS	PK	21.00	1	10	0.240	
PA0221	1015-00-000000	CHIEF STAFF RAIL	PK	85.61	0-6	1	0.120	
PA0521	1015-00-000036	CHIEF STAFF RAIL	PK	15.70	4	3	0.120	
PA0521	1015-00-000057	LEFT CANDLESTICK, FIBERGLASS	FT	52.52	4	3	0.120	
PA0521	1015-00-000057	RIGHT CANDLESTICK, FIBERGLASS	FT	100.00	25	3	0.120	
PA0521	1015-00-000057	RIGHT CANDLESTICK, FIBERGLASS	FT	12.03	2	3	0.120	
PA0521	1015-00-000057	RIGHT CANDLESTICK, FIBERGLASS	FT	6.00	1	1	0.120	
PA0521	1015-00-000058	SWIVEL CANDLESTICK, FIBERGLASS	FT	94.9	1	1	0.120	
PA0521	1015-00-000075	CHIEF STAFF FLAG	PK	13.01	2-4	1	0.120	
PA0521	1015-00-000075	MAINT. CHIEF STAFF FLAG	PK	9.67	27	10	0.120	
CA2521	1020-00-000012	SCALE GRAPHICAL	PK	10.00	2-4	1	0.120	
CA2521	1020-00-000012	NO REF.	PK	20.00	1-8	1	0.120	
CA1021	1033-00-000000	GRINDING PACHAFA-HAND OPERATED	PK	15.53	1	15	0.255	
CA1021	1033-00-000011	FORGE UNIFIT CUTTING	PK	144.64	0-2	1	0.120	
KA0021	1049-00-000002	SOLDIER ALIVE-TH ALLEY-ENGIN CO RE	PK	4.34	1	1	0.120	
KA0021	1049-00-000016	STITCHING-STEEL STRAPPING	PK	52.00	10	0-240	0.120	
PA0221	1540-00-000002	SEALER-STYL. STRAPPING	PK	56.00	5	3-240	0.120	
PA0221	1540-00-000002	SEALER-STYL. STRAPPING	PK	12.50	1	0-260	0.120	
KA0221	1540-00-000002	STAINLESS STEEL STRAPPING-HAND	PK	8.00	10	0-255	0.120	
CA1021	1550-00-000037	HANDLER KIT	PK	123.00	20	20	0.120	
CE2221	1570-00-000019	SPLITTER-INC SFCIDE-CAP. 2 GAI.	PK	25.43	2	5	0.120	
CE2221	1570-00-000046	FILTER FILTER-AIR	PK	22.35	2-4	1	0.120	
KA0121	1621-00-000058	EXTINCTION SHOT FUEL-CASE/CHIM OF CAP 15LB	PK	76.00	6	10	0.120	
KA0121	1621-00-000058	EXTINCTION SHOT-FIRE CHEMICAL-CAP 15LB	PK	54.00	10	0-240	0.120	
CA0912	1623-00-000016	DECONTAMINATING APPARATUS-PNTD-PC-AIC-MIL	PK	42.61	0	10	0.120	
CA0912	1623-00-000016	VICOMINATING AND IMPREGNATING KIT/MIL	PK	4.57	126	5	0.120	
CA0912	1623-00-000026	WASH-PROTECTIVE, FILL-IN-HEEL T-SHEEN CARTRIDG	PK	13.74	5	10	0.120	
CA0912	1623-00-000026	EGG-WASHABLE-PROTECTIVE MASK	PK	6.41	252	7	0.120	
CA0912	1623-00-000026	WASH-PROTECTIVE, FIELTE RITAL	PK	5.75	126	10	0.120	
CA0912	1623-00-000026	WASH CHEMICAL-JULOG	PK	6.62	8-4	1	0.120	
CA0912	1623-00-000026	CAP HELD CANISTER	PK	57.75	12-0	1	0.120	
CA0912	1623-00-000026	CARBON CHEMICAL	PK	1.02	64.0	1	0.120	
CA0912	1623-00-000026	FOOD MASK-CARBON/WASP MAF M642	PK	6.54	10-2	1	0.120	
CA0912	1623-00-000026	STAND-PAINT-AUTOMATIC AXLE-FLOOR ST CAP.	PK	8.66	12	1	0.120	
CA17621	1624-00-000013	HAFF KOFF	PK	411.00	0-7	1	0.120	
CC5921	1625-00-000016	JACK HYDRAULIC 4-TON TRUCK LIFT, WHEEL	PK	312.00	1	10	0.120	
CC5921	1625-00-000016	LOCKDOWN-HYDRAULIC	PK	92.73	1	10	0.120	
CC5921	1625-00-000016	LOCKDOWN-HYDRAULIC	PK	159.63	2	10	0.120	
CC5921	1625-00-000016	DISPARING PUMP-FAKE DTFVN	PK	26.51	1	10	0.120	
CC5921	1625-00-000016	DISPARING PUMP-HAve DRIVEN	PK	2.65	10	10	0.120	
CC5921	1625-00-000016	HATCHETIC HANDLE	PK	62.37	0-4	1	0.120	
CC5921	1625-00-000016	WRENCH SET-SELF SERV	PK	11.04	2-2	1	0.120	
CC5921	1625-00-000016	INFNITE) CAMPING	PK	16.04	1-9	10	0.120	
CC5921	1625-00-000016	SOCK HAMMUNIC-HAPE	PK	2.15	14	10	0.120	
CC5921	1625-00-000016	WRENCHES, M-FANNY	PK	3.40	126	7	0-480	0.120
CC5921	1625-00-000016	WRENCHES, M-FANNY	PK	0.2	30-6	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	95.15	6-6	10	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	379.00	1	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	137.00	0-5	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	167.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	64.00	2-8	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	26.00	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	56.25	1-2	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	173.25	1	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	211.16	0-5	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	269.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	113.25	1-0	1	0.120	
CC5921	1625-00-000016	WEACH SET-CLOTHING	PK	289.00	0-7	1	0.120	
CC5921	16							

TABLE F-2 (Continued)

TAN, COUNTRY, NUMBER	NATIONAL Stock N. NUMBER	ITEM NAME	QUANTITY ISSUED OR USED	WARTIME REPLACEMENT RATE	PEACETIME REPLACEMENT RATE
A659111	7106-60-0063507	TOOL KIT, SUPPLYANT SUPPLIES SET, CANVAS	140.00	.1	.1
	5165-60-1545451	TOOL KIT, WHEELS	140.00	.0.1	.0.1
	630-60-2693213	SCREW CAP, PLASTIC	20.00	.0.5	.0.5
K699526	6319-00-2610184	STAPLES	6.00	.5	.5
	6323-00-1606060	REFILLING PACKAG	18.15	0.6	0.6
	6346-60-1611414	TRIUMPH, TUBE	12.38	2.4	2.4
A612276	6346-00-2515523	PADDOCK, COMMUNICAT, HIGH SECURITY	19.90	.2	.2
A611521	6354-60-2402270	STEEL, WIRE	0.01	.1	.1
	6360-00-2352254	BALLPOINT PEN, SILVER	5.05	.6	.6
F421522	6230-60-1147671	CORALIGHT, CRYSTALIC 110V HVY. DUTY	0.28	.5	.5
A650225	6230-00-3280000	LATERAL, FLUORESC	6.00	.5	.5
A614620	6263-00-1616295	CANDLER, ILLUMINATING	140.69	.55	.55
C326226	6263-00-0170036	LATERA, SET, GASOLINE	140.75	.4	.4
C614021	6356-00-2706510	CHARGE AND OPERATE, CYCLOMOTOR, HIGH SECURITY	16.32	.1	.1
A611521	6365-00-1146173	LIPSTICK, ANTI-SKIN	6.49	126	126
C315226	6365-00-1230165	FLASH AID, PI, CLINIC(F)	10.40	2.1	2.1
F436621	6365-00-3221200	FLASH AID, MEDICAL PURPOSE	11.57	1.3	1.3
A622214	6365-00-1231117	FLASH, AGENT, JET, VARIOUS	0.25	.2	.2
F439221	6369-00-3635332	PAPER, PLASTIC, LIQUEFIED, SC FACH	42.89	2	2
C502221	6369-00-1236291	WATCH, STOP	46.00	1.0	1.0
C616921	6369-00-0052177	WEIGHT, CHOPPER	40.00	1.0	1.0
C210124	6369-00-0162319	WEIGHT, CRITICAL AGENT	40.00	1.0	1.0
	6370-00-7850000	WEIGHT, PLASTIC, BFGH	40.00	1.0	1.0
	6370-00-2401000	WEIGHT, SURVEYING	20.35	0.4	0.4
	6373-00-1153522	PLANE, TABLE SURVEYING	261.05	2.2	2.2
	6373-00-1155104	MICROCHIMICAL, FLOW, CONTINUOUS, INDIVIDUAL LFAS	35.61	.1	.1
F422721	6384-00-1151019	DISINFECTANT, CHEMICAL & FUNGICID	1.07	.1	.1
A611921	6385-00-1665538	FAN, CANTING, SILVER	8.27	.1	.1
C207424	6385-00-2946513	TECHNOLOGIC, ENGINEERING, AGILE, S10, SOLAR DRUP	20.34	2	2
A625624	6385-00-0534227	DECOPPLATING, ACETYL, 50% VOL, CAN	5.03	.1	.1
A616828	6385-00-0571616	TAKE, WATER, PURIFICATION	1.00	115	115
	7105-00-0092225	TABLE, SWEEPING LEGS, LP, AUTO	39.35	.4	.4
C641221	7105-00-1350427	COT-FOLDING, ALUMINUM, AND NYLON	1.05	126	126
B617921	7110-00-1005794	CLASSIFYING, COMPANY REPORT	1.00	1.0	1.0
B619621	7114-00-0018567	CLUBMAN, FILTRAC, AGENTS, PLAT	36.95	1.0	1.0
C613124	7115-00-02-03011	SICURITY, FAILING, CASH	36.95	1.0	1.0
	7129-00-1575751	CANTER, STORAGE	172.97	0.2	0.2
	7213-00-1211164	TOILET, DISH, SCALLOPED, PEGLICAL, MESS USE	6.00	1.0	1.0
C527221	7215-00-2465914	INSPECT, RAILROAD, TURNING, CUT, TYPE GO	14.50	126	126
C516221	7216-00-1175141	POLY, GLUCOSE, COTTON, FILTER, BAR, SET OF FOIL	0.62	126	126
C102226	7218-00-2927793	PIANIST, MD, GUIT	15.10	252	252
A643426	7246-00-0071827	CONTAINER, HEAVY, PLASTIC	10.22	70	70
B663524	7246-00-1706155	PAIL, METAL, 1/2 GAL, PLASTIC	4.65	6	6
A619221	7246-00-2221006	SPONGE, ALUMINUM, FRIGGLE, 16 IN LONG W/FILTER	3.06	6	6
	7246-00-2221014	COT, GLASS, MILITARY, BACK, COT, CAP	6.73	6	6
	7246-00-2255113	PRESUMED, LIQUID, GLCAP	6.30	2	2
A635221	7316-00-1581515	STOVE, SIGHT, STAINLESS STEEL	4.42	27	27
A636421	7319-00-1324915	THUMBLIK, ASSEMBLY	11.60	11.5	11.5
	7319-00-1324915	TRAVEL, SOFT, COT, FAIR, TEE, STUFF	10.17	5.7	5.7
R602221	7370-00-2221006	ENVELOPE, LIGHT AIR, CLOUDING, MARKING	1.00	1	1
	7370-00-2221014	FIELD, CONTAINING, ABSOL	91.04	1.4	1.4
	7370-00-2221014	JUG, TRAP	11.00	0.4	0.4
C116021	7384-00-0000057	KNIFE, TABLE, CRS, BLUNT, AND HANDLE	11.10	126	126
C60921	7384-00-0000075	KNIFE, PLATE, MACHINE	7.62	2	2
C66221	7384-00-0000075	PROCESSING, MACHINE, ACCESS, PLATE	10.71	10	10
C326221	7510-00-2644692	OFFICE, SUPPLY, STYLUS	17.36	15	15
C616621	7511-00-2644692	OFFICE, TYPEWRITER, 11 LP.	29.12	2	2
C679021	7511-00-2651799	FILE SET, OFFICE FEL160	210.35	15	15

TABLE F-2 (Continued)

ITEM NUMBER	NATIONAL STOCK NUMBER	DESCRIPTION	QUANTITY	UNIT PRICE	WARTIME PROCUREMENT RATE	
					PLANNED LIFE	INSULATED OR USED
1673616	7516-06-6560611	PUNCTURING SHEETS, PLASTIC, 1000 AFTER SCALE	14.00	10.0	5	2
	7516-06-6560612	PUNCTURING SHEETS, VINYL, 500	21.50			
1516-06-6561426	7516-06-6561426	CLEANING VALVE, 1/4" G-449/U	167.99	1	5	
1674226	197-07-00217171	HAG, BIRPING, 1 IN. GALE	21.15	1	1	
167422518	197-07-002171755	DEFROSTING, GUN, FUSIBLE	4.60	6	6	2
	197-07-002171757	EXHAUST	1.40			
167422518	197-07-002171753	EXHAUST, GUN, FUSIBLE	5.92	6.6	6.6	
	197-07-002171755	EXHAUST	5.92	4.2	4.2	
	197-07-002171757	EXHAUL	5.92	1.5	1.5	
1673616	7516-06-65606129	EXHAUL, DRESSING, VISCOSITY, GAS RESISTANT, #2	30.00	1.2		
	7516-06-65606130	EXHAUL, DRESSING, VISCOSITY, GAS RESISTANT, #2	30.00	2.0		
1673616	8115-06-6570614	LAG, FESTIVE	0.40			
1673616	8115-06-6570608	LAG, FESTIVE	0.40			
	8115-06-6570611	LAG, FESTIVE	0.40			
	8115-06-6570550	LOAD, SHIPPING	17.70	4.6	4.6	
	8115-06-6570613	LOAD, SHIPPING	1.45	0.7	0.7	
	8115-06-6570615	REFL, LABELED	20.51			
	8115-06-6570617	REFL, STRAPPING, FLAT	44.35	1	1	
	8115-06-6570618	REFL, STRAPPING, FLAT	25.00	5	5	
	8115-06-6570619	REFL, SECTION, PENT	0.40	37.9	3	
	8115-06-6570620	REFL, SECTION, PENT	69.00	0.4	0.4	
	8115-06-6570621	REFL, SECTION, PENT	2616.64	1	10	
	8115-06-6570622	REFL, SECTION, PENT	0.40	63.0	1	
	8115-06-6570623	REFL, SECTION, PENT	121.25	1	20	
	8115-06-6570624	REFL, SECTION, PENT	0.40	126	2	
	8115-06-6570625	REFL, SECTION, PENT	0.40	3	10	
	8115-06-6570626	REFL, SECTION, PENT	74.04	4	19	
	8115-06-6570627	REFL, SECTION, PENT	25.20	8	5	
	8115-06-6570628	REFL, SECTION, PENT	1116.40	4	10	
	8115-06-6570629	REFL, SECTION, PENT	1.16	12	7	
	8115-06-6570630	REFL, SECTION, PENT	120.00	2	10	
	8115-06-6570631	REFL, SECTION, PENT	0.40	15	5	
	8115-06-6570632	REFL, SECTION, PENT	7.10	5	5	
	8115-06-6570633	REFL, SECTION, PENT	0.40	1	5	
	8115-06-6570634	REFL, SECTION, PENT	0.40	1	5	
	8115-06-6570635	REFL, SECTION, PENT	2.97	12	5	
	8115-06-6570636	REFL, SECTION, PENT	2.75	12	5	
	8115-06-6570637	REFL, SECTION, PENT	16.40	12	5	
	8115-06-6570638	REFL, SECTION, PENT	10.40	12	5	
	8115-06-6570639	REFL, SECTION, PENT	126	5	5	
	8115-06-6570640	REFL, SECTION, PENT	13.50	126	5	
	8115-06-6570641	REFL, SECTION, PENT	17.00	5	5	
	8115-06-6570642	REFL, SECTION, PENT	2.00	126	3	
	8115-06-6570643	REFL, SECTION, PENT	2.00	10	6	
	8115-06-6570644	REFL, SECTION, PENT	20.60	10	6	
	8115-06-6570645	REFL, SECTION, PENT	30.00	5	10	
	8115-06-6570646	REFL, SECTION, PENT	22.00	2	10	
	8115-06-6570647	REFL, SECTION, PENT	17.4			
	8115-06-6570648	REFL, SECTION, PENT	11.30	12	3	
	8115-06-6570649	REFL, SECTION, PENT	10.00	12	3	
	8115-06-6570650	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570651	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570652	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570653	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570654	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570655	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570656	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570657	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570658	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570659	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570660	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570661	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570662	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570663	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570664	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570665	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570666	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570667	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570668	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570669	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570670	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570671	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570672	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570673	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570674	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570675	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570676	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570677	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570678	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570679	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570680	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570681	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570682	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570683	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570684	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570685	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570686	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570687	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570688	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570689	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570690	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570691	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570692	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570693	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570694	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570695	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570696	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570697	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570698	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570699	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570700	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570701	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570702	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570703	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570704	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570705	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570706	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570707	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570708	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570709	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570710	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570711	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570712	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570713	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570714	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570715	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570716	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570717	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570718	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570719	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570720	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570721	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570722	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570723	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570724	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570725	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570726	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570727	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570728	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570729	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570730	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570731	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570732	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570733	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570734	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570735	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570736	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570737	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570738	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570739	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570740	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570741	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570742	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570743	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570744	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570745	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570746	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570747	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570748	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570749	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570750	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570751	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570752	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570753	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570754	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570755	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570756	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570757	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570758	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570759	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570760	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570761	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570762	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570763	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570764	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570765	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570766	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570767	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570768	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570769	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570770	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570771	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570772	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570773	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570774	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570775	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570776	REFL, SECTION, PENT	0.40	12	3	
	8115-06-6570777	REFL, SECTION, PENT	0.40	12	3	
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TABLE F-2 (Continued)

TAM CONTINUOUS NUMBER	NATIONAL STOCK NUMBER	ITEM NAME	UNIT PRICE	QUANTITY ISSUED OR USED	PLANNED LIFE	WARRANT REPLACEMENT	PERMITTING REPLACEMENT RATE
C340529	8465-07-0016676	SHELF-CARGO SUPPORT (INCLUDES) SWING-OUT DISPLACEMENT (INCLUDES)	.96	15	6	1-000	0.204
C341117	8465-07-0016677	SH10 PAK	1-25	50	6	1-000	0.204
C310529	8465-07-0016678	CASF-SMALL ARPS, APC-SIGAR U/W MIC (INCLUDES) BELT-INDIVIDUAL-FILIP PULLON WEBBING (INCLUDES)	16.00	17.8	17.8	1-000	0.204
C340527	8465-07-0016680	GOOGLES SWIMMING AND DUST CUP-HAIR CAP/HAT-A-CAP/HAT-C/S-W/FOLDABLE (INCLUDES)	2-55	199	17	1-000	0.204
B317226	8465-07-0042995	RAC-DIFFERENT-MATERIALS-PERSONAL EFFECTS	4-45	25	5	1-000	0.204
C314044	8465-07-0056338	CASF-SLEEPING MATER. (INCLUDES)	5-44	126	10	1-000	0.204
B301627	8465-07-0074079	CASF-SLEEPING MATER. (INCLUDES)	1-10	7	10	1-000	0.204
C311028	8465-07-0074079	CASF-SLEEPING MATER. (INCLUDES)	16.30	126	10	1-000	0.204
C340929	8465-07-0074084	FLG-10MM ILLUMINATION PERSONNEL WHISTLE-BALL-PLASTIC	0.65	252	5	1-000	0.204
C333026	8465-07-0074083	WHISTLE-PERSONNEL L TAG	0.51	16	5	1-000	0.204
A083021	8465-07-0074029	PAD-HAIRSPRONG-COMBING	6.15	126	10	1-000	0.204
C342521	8465-07-0074099	STRAP-ARMED LINE BACK STRAP-FLO-FRAG	2-59	27	5	1-000	0.204
C326221	8465-07-0074099	STRAP-ARMED LINE BACK STRAP-FLO-FRAG	2-13	33	6	1-000	0.204
C326222	8465-07-0074099	STRAP-ARMED LINE BACK STRAP-FLO-FRAG	2-06	30	6	1-000	0.204
C342621	8465-07-0074098	STRAP-WEAPONS-MODULER LEFT	2.66	120	6	1-000	0.204
C342622	8465-07-0074098	STRAP-WEAPONS-MODULER RIGHT W/O QUICK RE MAIN SS INSULATED, PLASTIC (INCLUDES)	2.35	120	6	1-000	0.204
C311022	8465-07-0074093	POCKET PAPEL-GAZETTE PISTOL CAL 45	1-40	126	5	1-000	0.204
C316026	8465-07-0074029	COMB-HAIRSCAFFOLDING-PYTHON (INCLUDES)	1-50	27	5	1-000	0.204
C313021	8465-07-0060256	CANTEEN-HAIR-PLASTIC (INCLUDES)	2-35	252	5	1-000	0.204
C306L21	8465-07-0073144	CANTEEN-HAIR-PLASTIC (INCLUDES)	0-62	252	10	1-000	0.204
Head1622	8465-07-0074032	PACIFICLANDS PACIFICLANDS AN RIF	2-17	10	10	1-000	0.204
C313826	8465-07-0019910?	PACIFICLANDS PACIFICLANDS AN RIF	16.50	120	6	1-000	0.204
C392027	8465-07-002026	SLEEPING BAG-INTERMEDIATE COLD-THERMAL	60.46	56.9	5	1-000	0.204
F477-07-0074008	8465-07-0074008	SLEEPING CHSP	55.00	126	5	1-000	0.204
C320626	8470-07-0013661	H-140940D-GRD TADS-FACIALISTS-Helmet LINN HELMET-GRD TADS-SOLID WELAIS CHIN STRP	1-58	126	5	1-000	0.204
C322226	8470-07-0055859	ARMOR-JUDY LCWQ TADS FHAG-PROTECTION	6.92	126	5	1-000	0.204
Head6426	8470-07-0074191	ARMOR-JUDY UPPN HON SO-FRAG- PROJECT-OG 1CP	7-66	7-23	5	1-000	0.204
C312026	8470-07-0074194	LIAF-FABACHUTISTS-SAFETY OG-SALISTIC ANL ANCHING-GRD TADS-FABACHUTISTS HELMET LINN	7-66	126	5	1-000	0.204
C322026	8470-07-0074195	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322027	8470-07-0074196	LIAF-GROUND TADS-FABACHUTISTS HELMET LINN	7-66	126	5	1-000	0.204
Head6427	8470-07-0074197	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322028	8470-07-0074198	LIAF-GROUND TADS-FABACHUTISTS HELMET LINN	7-66	126	5	1-000	0.204
C322029	8470-07-0074199	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322030	8470-07-0074200	LIAF-GROUND TADS-FABACHUTISTS HELMET LINN	7-66	126	5	1-000	0.204
Head6428	8470-07-0074201	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322031	8470-07-0074202	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322032	8470-07-0074203	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322033	8470-07-0074204	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322034	8470-07-0074205	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322035	8470-07-0074206	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322036	8470-07-0074207	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322037	8470-07-0074208	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322038	8470-07-0074209	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322039	8470-07-0074210	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322040	8470-07-0074211	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322041	8470-07-0074212	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322042	8470-07-0074213	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322043	8470-07-0074214	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322044	8470-07-0074215	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322045	8470-07-0074216	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322046	8470-07-0074217	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322047	8470-07-0074218	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322048	8470-07-0074219	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322049	8470-07-0074220	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322050	8470-07-0074221	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322051	8470-07-0074222	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322052	8470-07-0074223	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322053	8470-07-0074224	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322054	8470-07-0074225	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322055	8470-07-0074226	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322056	8470-07-0074227	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322057	8470-07-0074228	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322058	8470-07-0074229	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322059	8470-07-0074230	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322060	8470-07-0074231	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322061	8470-07-0074232	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322062	8470-07-0074233	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322063	8470-07-0074234	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322064	8470-07-0074235	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322065	8470-07-0074236	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322066	8470-07-0074237	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322067	8470-07-0074238	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322068	8470-07-0074239	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322069	8470-07-0074240	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322070	8470-07-0074241	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322071	8470-07-0074242	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322072	8470-07-0074243	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322073	8470-07-0074244	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322074	8470-07-0074245	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322075	8470-07-0074246	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322076	8470-07-0074247	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322077	8470-07-0074248	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322078	8470-07-0074249	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322079	8470-07-0074250	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322080	8470-07-0074251	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322081	8470-07-0074252	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322082	8470-07-0074253	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322083	8470-07-0074254	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322084	8470-07-0074255	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322085	8470-07-0074256	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322086	8470-07-0074257	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322087	8470-07-0074258	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322088	8470-07-0074259	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322089	8470-07-0074260	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322090	8470-07-0074261	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322091	8470-07-0074262	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322092	8470-07-0074263	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322093	8470-07-0074264	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322094	8470-07-0074265	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322095	8470-07-0074266	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322096	8470-07-0074267	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322097	8470-07-0074268	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322098	8470-07-0074269	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322099	8470-07-0074270	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322100	8470-07-0074271	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322101	8470-07-0074272	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322102	8470-07-0074273	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322103	8470-07-0074274	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322104	8470-07-0074275	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322105	8470-07-0074276	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322106	8470-07-0074277	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322107	8470-07-0074278	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322108	8470-07-0074279	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322109	8470-07-0074280	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322110	8470-07-0074281	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322111	8470-07-0074282	SUSPENSION ASSMNT	6.92	126	5	1-000	0.204
C322112	8470-07-0074283	SUSPENSION ASSMNT	6.92	126</			

TABLE F-3

ITEM NUMBER	ITEM NAME	ITEM NAME	QUANTITY ISSUED OR USED	PLANNED LIFT	WARTIME REPLACEMENT RATE	PRACTICING REPLACEMENT RATE
K41371	CONE-CR-CONDUIT REINFORCED	PAINTING-CR-110-1110-1111 EXTINGUISHER, WATER-CARTRIDGE, CAP 15 LBL	1.20	6	2	
K431971	471C-CC-7027154	FIRE EXTINGUISHER, FIRE CHEMICAL-CAP 10 LBL	76.00	6	10	
K452121	421H-00-5356746	STAND, PAIL, AUTOMATIC WHEEL, 50 LB.	54.47	23	10	
K460161	4-10-C-627122	JACK, HYDRAULIC-10 TON	11.46	12	10	
K509621	491C-CC-3165006	JACK, HYDRAULIC-10 TON	242.00	1	10	
K610521	4930-00-3545201	TRUCK, LIFT, MEDIUM	312.00	1	10	
K610521	4646-00-1498681	DEGRASSER, EJECTANT F, 20 GAL.	292.00	1	10	
K612030	51420-00-2356829	JAC, HORN ALARM-HD	11.84	1.5		
K620641	5135-00-1843426	WRENCH, PIPE, STRAIGHT, DRIVE, 3/4"	379.00	1	10	
K620751	51869-00-2865623	PADLOCK, DISMANTLABLE HIGH SECURITY	11.50	2	5	
K620751	6230-00-929964	LATCH, ELECTRICAL	6.00	4	1	
K621441	675C-CC-270510	SILVER, PLATE, CARTRIDGE CARRYING STRAP	95.75	1	10	
K622221	6605-00-1215137	COMPASS-MAGNETIC, UNPOINTED	10.37	4.3	10	
K622221	6645-00-1225296	WATCH, STCP	42.89	2	3	
K626041	6645-00-9252316	WRENCH, SCREWDRIVER	23.67	1.6	5	
K659571	7095-00-9692795	WRENCH, SWING LIPS, 10-1/2"	39.15	4	5	
K660021	7105-00-9350422	CLIP-FLICK, GRIPWIPER AND NYLON	25.15	126	5	
K662221	7210-00-2027750	BLANKET, ROLL, GREEN	15.10	252	15	
K664021	741C-9C-76623	TIN, WATER	211.65	0.4		
K664021	7519-00-2644224	URFICE SUPPLY, SFIO, F17-F18-F19-F20-F21 FA.	755.17	2		
K664021	7516-CC-6511551	GLOVE, GLOVE, VACUUM-4470/U	167.09	1		
K427521	2571-00-2029405	CERTIMENT, CRAFT, FILTER	4.60	6	2	
K534910	8349-00-2535234	Filter	69.00	0.4		
C662221	8341-00-2575537	TFNT, MAINTENANCE SP-FILTER	2616.64	1	10	
C676221	8369-00-2675129	FLY TENT, SIGHT	54.00	3	10	
C691921	8346-00-1532176	TFNT, COMMAND, F11	744.14	4	10	
K457221	8340-00-4764712	TFNT, ALUM, TAFT, 1/6 CT	75.00	6	5	
C641221	8341-00-1437728	TFNT, GENERAL, FILTER, MEDIUM	111K.00	4	10	
C641221	8341-00-1777010	TAPE, TAPE, 1/2 IN X 22 FT	120.00	2	10	
K423021	8402-00-1316507	COVING, WMS, COITION, SAFETY OG	16.00	12	3	
C114221	8403-00-1247537	PARKA, MEDIUM, BATTENFALL, TWILL, GREEN	135.90	126	5	
C117021	8405-00-9955727	OFFICIAL, SET, DRAIL, NYLON TWILL, GREEN	13.20	126	5	
C117021	8411-00-7556803	PITTEN, HEAT, PROTEC]	3.44	12	4	
C117021	8411-00-4764704	LIN, LIN, WIRE, WIRE, CLAY, NYLON, FIELD JNT	0.40	126	5	
C106021	8415-00-1422033	GAUL, GUL, BATTENF, SECTION & NYLON CGW/400	25.00	126	5	
C169021	8415-00-1646411	DRAIL, RG, CLOTH, CLOTH, COTTON AND NYLON, PLAT	6.25	252	2	
C126621	8415-00-2045135	ENDLESS, PLASTIC, NYLON, NYLON, NYLON	7.5	252	2	
C344021	8469-00-1910532	SWITCH, CENTER, FOLDING TYPE	49.10	1.5	10	
C311821	8445-00-1827291	PATENT, INSULATED, FRACTIC (INCLUDE)	13.60	126	5	
K664521	8520-00-1290005	SOP, GRIP, PASTE, GRIP	1.05	1.000	0.374	

TABLE F-4

F-14

TABLE F-4 (Continued)

F-15

**DATE
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